Ontario

ONTARIO GEOLOGICAL SURVEY

Open File Report 6047

Report of Activities, 2000
Resident Geologist Program

Red Lake Regional Resident Geologist Report:
Red Lake and Kenora Districts

by

A. Lichtblau, A. Raoul, C. Ravnaas, C.C. Storey, L. Kosloski, R. Debicki and A. Drost

2001

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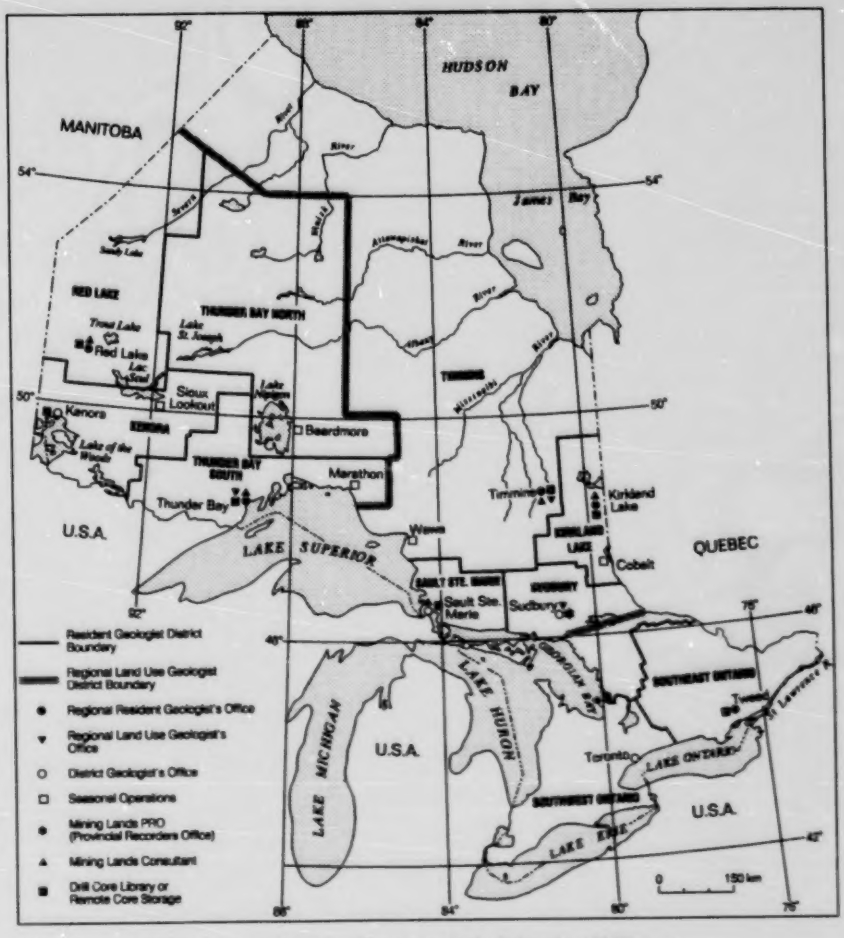

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Ontario Geological Survey

Resident Geologist Program

Report of Activities – 2000

RED LAKE
REGIONAL RESIDENT GEOLOGIST REPORT

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Red Lake Regional Resident Geologist (Red Lake District)–2000

by

A. Lichtblau, C.C. Storey and L. Kosloski

2001

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RED LAKE REGIONAL RESIDENT GEOLOGIST (RED LAKE DISTRICT)–2000

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INTRODUCTION

Gold continues to be the only commodity mined in the Red Lake District. Total production (Table 1) rose to 314 524 ounces: a 12% increase over last year's total, due to the opening of Goldcorp Inc.'s Red Lake Mine after resolution of a lengthy strike. There was no gold production from Claude Resources Inc.'s Madsen Mine, where dewatering and shaft rehabilitation were carried out until the end of the year, when the mine and adjacent exploration properties were optioned to Placer Dome.

Table 1. Mine production and reserves in the Red Lake District in 2000

Mine	Production to end of 1999		Production in 2000		Reserves at end of 2000	
	Tonnage @ Grade	Total Commodity	Tonnage @ Grade	Total Commodity	Tonnage	Grade
Placer Dome North America Campbell Mine	560 155 tons @ 15.1 g/t Au	262 015 ounces Au	473 000 tonnes @ 15.7 g/t Au	229 408 ounces Au	3 199 000 tonnes (1)	15.3 g/t Au
Goldcorp Inc. Red Lake Mine	none	none	74 148 tons @ 1.57 ounce Au per ton	85 116 ounces Au	2 878 000 tonnes (2)	38.47 g/t Au
Madsen Gold Corp. Madsen Mine	149 416 tons @ 0.14 ounce Au per ton (4)	18 499 ounces Au	none	none	269 318 tons (3)	0.25 ounce Au per ton

(1) News release, Placer Dome Inc. January 23, 2001.
(2) News release, Goldcorp Inc. January 25, 2001.
(3) Estimated proven and probable reserves to February 1999 and does not include 732 830 tons of indicated resources @ 0.34 ounces per ton.
(4) Does not include historic 1938 to 1976 production

Thirty-one exploration programs were carried out in the Red Lake District in 2000. The Red Lake and Birch-Confederation-Uchi lakes greenstone belts were the major focus of this exploration. Gold was the predominant commodity sought. A brief rise in the price of gold at the end of January 2000, to above $US310 per ounce, was not sustained through February. Gold closed the year at $US274 per ounce.

Minor activity north of 51°N concentrated on platinum group element (PGE) and rare metal pegmatite exploration. The price of palladium rose from approximately $US440 per ounce in January, to $US956 at year end.

Staff of the Red Lake Resident Geologist's Office made twenty-three visits to active and inactive mineral properties during the field season. A reconnaissance sampling program of intrusive rocks that may host PGE mineralization was started this year.

MINING ACTIVITY

Gold production in the Red Lake area commenced in 1930; historical statistics for each mine are presented in Table 2. Placer Dome Inc.'s Campbell Mine continued production throughout the year; Goldcorp Inc.'s Red Lake Mine recommenced mining and milling operations on August 1, 2000, after resolution of a three year, ten month strike of unionized employees. Both mines are in Balmer Township, 10 km northeast of Red Lake.

Placer Dome North America – Campbell Mine

The Campbell Mine has been in continuous operation since 1949 and produced its ten millionth ounce of gold in April of this year. The mill has nominal capacity of 1500 tons per day. The mine employs 401 people. Joc O'Rourke was Mine Manager until the beginning of December; the post was left vacant until the first Quarter of 2001.

The Reid Shaft, commissioned in October 1999, increased efficiencies in mining, hoisting up to 2500 tonnes per day of ore and waste. During the year underground diamond drilling totaled approximately 67 360 m and new drifting totaled 4804 m (*S. Morris, Placer Dome North America Ltd., personal communication, 2001*).

On June 9th, a rockburst centred below the 16th level left one miner dead and another seriously injured. The resultant 9-day shut-down and resequencing of production below the 27 level in addition to mechanical problems with the ball mill bull gear negatively affected gold production for the year (*3rd Quarter Report, Placer Dome Inc.*). A total of 229 408 ounces of gold were poured during 2000, 12% lower than 1999 production levels (*news release, Placer Dome Inc., February 15, 2001*).

Exploration efforts continue to be focussed on delineation of ore at depth, from drill stations on the 33, 36 and 39 levels. No surface drilling was carried out on the immediate Campbell Mine property.

Goldcorp Inc. – Red Lake Mine

The three year ten month strike by unionized employees (United Steelworkers of America local 950) was ended April 20, 2000. The settlement gave the miners a severance package of four weeks pay for every year worked and a $1500 signing bonus. USWA Local 950 was decertified. As part of the resolution Goldcorp would rehire forty-five of its previous employees (*news release, Goldcorp Inc., April 21, 2000*). At year end the mine employed 230 people (including contractors). Claude Lemasson is Mine Manager.

The first gold was poured on August 1st. During the startup and commissioning period for the Red Lake Mine, from August 1st to December 31st, 85 116 ounces gold from 74 148 tons of ore at a grade of 1.57 ounces of gold per ton (53.8 g/t gold) were produced (*news release, Goldcorp Inc., January 15, 2001*). The gravity circuit accounted for 68% of the gold poured, the conventional CIP circuit accounting for the

remainder. Overall recovery was 87%. Full commercial production at 600 tons per day was achieved January 1, 2001.

Table 2. Gold production in the Red Lake District to December 31, 2000

MINE	YEARS OF PRODUCTION	ORE MILLED (SHORT TONS)	GOLD PRODUCED	
			TROY OUNCES	OUNCES PER TON
CAMPBELL RED LAKE	1949 - PRESENT[1]	17,497,051	10,157,109	0.581
GOLDCORP (DICKENSON)	1948 - PRESENT[2]	8,372,390	3,233,319	0.386[3]
MADSEN	1938 - 1976, 1997[4] - 1999	8,678,143	2,452,388	0.289[5]
COCHENOUR-WILLANS	1939 - 1971	2,311,165	1,244,279	0.538[6]
MCKENZIE RED LAKE	1935 - 1966	2,353,833	651,156	0.277
HOWEY	1930 - 1941, 1957[7]	4,630,779	421,592	0.091[8]
HASAGA	1938 - 1952	1,515,282	218,213	0.144
STARRATT OLSEN	1948 - 1956	907,813	163,990	0.181
BERENS RIVER	1939 - 1948	560,607	157,341	0.281
UCHI	1939 - 1943	757,074	114,467	0.150
JASON (ARGOSY)	1934 - 1952	276,573	101,875	0.368
H.G. YOUNG	1960 - 1963	288,179	55,244	0.192
SACHIGO RIVER	1938 - 1941	46,457	52,560	1.131
MCMARMAC	1940 - 1948	152,978	45,246	0.296
GOLD EAGLE	1937 - 1941	180,095	40,204	0.223
JACKSON MANION	1934 - 1940	105,357	27,142	0.258
RED LAKE GOLD SHORE	1936 - 1938	86,333	21,100	0.244
HUDSON PATRICIA	1936 - 1937	11,228	1,857	0.165
BUFFALO	1981 - 1982	31,986	1,656	0.052
ABINO	1985 - 1986	2,733	1,397	0.511
LAKE ROWAN	1986 - 1988	13,023	1,298	0.100
KOSTYNUK BROTHERS	1963 - 1966	577	1,126	1.951
BOBJO	1929	N/A	362[9]	N/A
BATHURST	1927 - 1937	562	307	0.546
RED SUMMIT	1935 - 1936	591	277	0.469
MOUNT JAMIE	1976	552	265	0.48
SOL D'OR	1933 – 1936	458	258	0.563
MCFINLEY	1987	N/A	N/A	N/A
TOTAL		**48,783,019**	**19,165,689**	**0.393**

NOTES: (1) Includes final production figures for 2000.
(2) For 1997, 1998 and 1999 no production due to strike by unionised employees.
(3) From 1970, includes production from Robin Red Lake.
(4) Includes clean up ore and materials from the mine site.
(5) Historic grade, actual grade for 1999 was 0.14 ounce per ton gold.
(6) Includes production from Annco and Wilmar properties.
(7) Continuous production 1930 to 1941; includes 268 ounces recovered from clean up in 1957.
(8) The ore mined at Howey, before sorting totalled 5,158,376 tons.
The average production from run-of-mine ore was therefore 0.0817 ounce per ton gold.
(9) Not included in total production figure
N/A Data not available

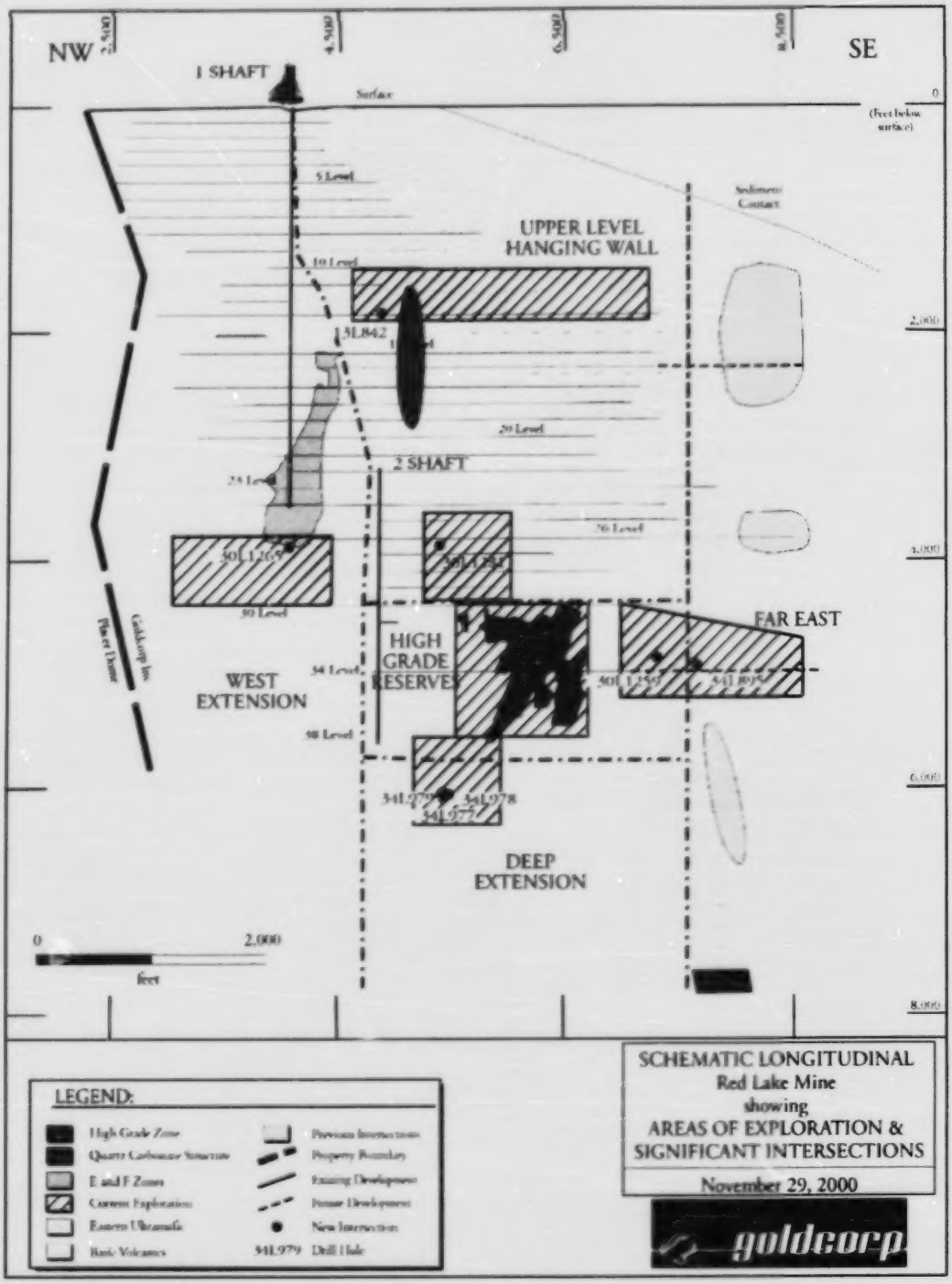


Figure 1. Longitudinal Section Red Lake Mine, Goldcorp Inc.

During the strike, underground development continued and exploration drilling significantly increased the reserve base to 2.32 million ounces gold in 1.70 million tons of ore at an average grade of 1.37 ounces of gold per ton (46.97 g/t gold) (Watts, Griffis and McOuat 2000). By year end, reserves were increased to 3.02 million ounces with a cut diluted grade of 1.68 ounces of gold per ton (57.6 g/t gold), the proven ounces component of the High Grade Zone reserves increased to 1.4 million ounces at a grade of 2.01 ounces of gold per ton (68.9 g/t gold) (*news release, Goldcorp Inc. January 25, 2001*).

Underground drilling for the year totaled 58 708 m. Definition drilling of 402 diamond drill holes (totaling 25 282 m) occurred within known reserve areas; the remainder (94 holes totaling 33 426 m) tested five priority areas (Figure 1), four of which (Deep Extension, Far East, West Extension and Footwall) tested the continuity of the High Grade zone, while drilling in the Upper Level Hanging Wall tested the lower grade sulphide zones. One surface exploration hole (totaling 867 m) was completed on the mine property.

The company initiated the "Goldcorp Challenge" in March of this year, a global internet challenge to explorationists and interested parties world-wide. Contestants were asked to submit an exploration proposal for the Red Lake Mine detailing up to three prioritized targets that may host the "next 6 million ounces". All of Goldcorp's proprietary geological data was made available on CD ROM, along with software to display and analyze it. Twenty-five semifinalists were announced in September, each entry winning $US10,000. After further information on the submissions is studied by the panel of independent judges, three finalists (eligible for prizes of $US95,000, $US80,000 and $US75,000) will be chosen in the first quarter of 2001.

Claude Resources Inc.—Madsen Mine

Work at the Madsen Mine over the course of the year comprised dewatering of the old workings to the 16th level and shaft rehabilitation from surface down to the 15th level. Exploration and definition drilling of the No. 8 Zone was planned to proceed from a northward directed exploration drift. On November 8, 2000, Placer Dome Canada Ltd. optioned the mine property and the contiguous exploration properties (totaling approximately 4200 hectares). Placer Dome became operator on December 15th, after a due diligence period. Placer Dome can earn an initial 55% working interest in the property by spending $8.2 million over three years and by delivering to Claude Resources a bankable feasibility study by the end of the fifth year. Placer Dome intends to drill the No. 8 Zone from surface in January, 2001. The mine is being kept on a care and maintenance basis.

EXPLORATION ACTIVITY

Assessment work received is listed in Table 3 and a complete summary of exploration activity is given in Table 4. Low gold prices and a drastic global reduction in investment in the junior mining and exploration sector has caused a similar reduction in the number of companies active in the district and the overall exploration investments. **Goldcorp Inc.** continued its long-standing exploration programs on a number of properties in the Red Lake belt. **Claude Resources Inc.** continued exploration on its Madsen Property holdings, around the Madsen Mine.

Programs with significant exploration expenditures and/or significant known results, and properties whose location is of particular strategic or geologic interest are described below. Exploration information included in this section is taken from the assessment files in the Red Lake Resident Geologist's office, unless otherwise indicated. Programs are keyed with numbers in parentheses to Table 4 and Figures 2, 3, 4 and 5.

Table 3. Assessment files received in the Red Lake District in 2000.

Abbreviations

AEM ..... Airborne electromagnetic survey
AM ..... Airborne magnetic survey
ARA ..... Airborne radiometric survey
Beep ..... Beep Mat survey
Bulk ..... Bulk sampling
DD ..... Diamond drilling
DDH ..... Diamond drill hole(s)
DGP ..... Down-hole geophysics
GC ..... Geochemical survey
GEM ..... Ground electromagnetic survey
GL ..... Geological Survey
GM ..... Ground magnetic survey
GRA ..... Ground radiometric survey
Grav ..... Gravity survey
HLEM ..... Horizontal loop electromagnetic survey
HM ..... Heavy mineral sampling
IM ..... Industrial mineral testing and marketing
IP ..... Induced polarization survey
Lc ..... Linecutting
Met ..... Metallurgical testing
OD ..... Overburden drilling
ODH ..... Overburden drill hole(s)
OMIP ..... Ontario Mineral Incentive Program
OPAP ..... Ontario Prospectors Assistance Program
PEM ..... Pulse electromagnetic survey
PGM ..... Platinum group metals
Pr ..... Prospecting
RES ..... Resistivity survey
Samp ..... Sampling (other than bulk)
Seismic ..... Seismic survey
SP ..... Self-potential survey
Str ..... Stripping
Tr ..... Trenching
UG ..... Underground exploration/development
VLEM ..... Vertical loop electromagnetic survey
VLFEM .... Very low frequency electromagnetic survey

Township or Area	Company Name	Year	Type of Work	AFRO Number (Report of Work Number)*
Ball Township	Maciejewski, A.J.	2000	Str, Tr, Samp, Assays	2.20537 (67-2000)
Balmer Township	Goldcorp Inc.	2000	DDH(6)=14,476.7', Assays	2.20365 (57-2000)
Balmer Township	Goldcorp Inc. (Red Lake Mine Property- "The Challenge")	1999	GC, GL, Reserve Figures	Non-Assess
Balmer Township	Royal Roads Corp. (Adams Lake Gold Property)	1999-2000	Lc, GM, VLF-EM	2.20371 (55-2000)
Balmer Township	Royal Roads Corp. (Adams Lake Gold Property)	2000	DDH(3)=739m, Samp, Assays	2.20718 (82-2000)
Bateman Township	Rivard, O. (Cross Island Property)	1999	DDH(1)=212' (Deepening Hole No. 2), Expenses	2.20071 (22-2000)
Balmer Township	Rubicon Minerals Corporation (Peterson Property)	2000	DDH(2)=873.6m, Samp, Assays (Whole Rock)	2.20733 (85-2000)

Township or Area	Company Name	Year	Type of Work	AFRO Number (Report of Work Number)*
Bateman Township	Stechishen, Anthony M. (North Bateman Property)	1999	Pr, Lc, GL, Samp, Assays	2.20323 (50-2000)
Bateman Township and Blackbear Lake Area	Consolidated Westview Resources (East Bay Gold Property)	1999	DDH(4)=1066.4m, Samp, Assays	2.20053 (15-2000)
Bateman, Fairlie, and McDonough Townships	Rubicon Minerals Corporation (Red Lake Property)	1999	Lithogeochem, Assays	2.20536 (69-2000)
Belanger Township	Noranda Mining & Exploration Inc. (Inmet-Garnet Lake Option)	1997-1998	DDH(28)=14,867.5m, Assays	2.20063 (14-2000)
Belanger Township	Nuinsco Resources Ltd. (Belanger Property)	2000	Lc, PEM	2.20382 (54-2000)
Belanger Township	English, P./Williamson, J. (Belanger Property)	1999	Pr, Tr, Sr, Samp, Assays	2.20006 (10-2000)
Brownstone and Casummit lakes areas	Newco (Redbird Gold Corp. & 1349563 Ontario Ltd.) (Gold Pointer Lake Property)	1999	Samp, Str, Assays	2.20018 (1-2000)
Casummit Lake Area	Wolfden Resources Inc. (Argosy Mine Property)	1999	Samp, Str, Lc, GM, VLF-EM, Assays	2.20036 (2-2000)
Casummit Lake Area	English, Perry (Argosy Mine Property)	1999	Rehabilitation – Environmental Assessment, Samp, Assays	2.20010 (3-2000)
Casummit and Satterly lake Area	Gold Canyon Resources Inc./ Paso Rico Resources Ltd. (Springpole Property)	1999	DDH(12)=2779m, Samp, Assays	2.20499 (65-2000)

Township or Area	Company Name	Year	Type of Work	AFRO Number (Report of Work Number)*
Coli Lake Area	Planet Exploration Inc. (Sidace Lake Project)	1999	DDH(6)=1195m, Assays	2.20037 (7-2000; 8-2000)
Dent and Mitchell Townships	Confederation Minerals Ltd. (Mitchell Twp. Project)	1998	PEM	2.19920 (109-99)
Dome Township	Cypress Development Corp. (McKenzie Island Property)	2000	GM, Lc	2.20461 (62-2000)
Dome Township	Rubicon Minerals Corporation (McCuaig Property)	1998	GL, Samp, Assays, GC, reassay DD's	2.20175 (42-2000)
Dome and Heyson Townships	Peterson, C.W. (Skookum Bay Property)	1998	GL, Str, Tr, Samp, Assays	OP98-038
Ear Falls, Karas Lake, Maskerine Lake, and Slate Lake areas	Kenora Granite Company Limited (Dimension Stone)	1998	GL, Str, Bulk, Cut and Polish Tiles	2.20458 (50-2000, 58-2000, 59-2000)
Fairlie Township	Rubicon Minerals Corporation (Humlin West Property)	1999	Samp, Assays, Lithogeochem	2.20366 (59-2000)
Heyson Township	Barrick Gold Corporation (Heyson Project)	1996	DDH(4)=2897.7m, Assays	Non-Assess
McDonough Township	Rubicon Minerals Corporation (Red Lake Property - Slate Bay)	2000	Str, Tr	2.20713 (80-2000)
McDonough Township	Rubicon Minerals Corporation (Red Lake Property - Slate Bay)	2000	Samp, Assays (Whole Rock)	2.20751 (87-2000)
Mitchell Township	Nuinsco Resources Ltd. (Mitchell Property)	1999	DDH(3)=1007.67m, Borehole PEM	2.20072 (16-2000)

Township or Area	Company Name	Year	Type of Work	AFRO Number (Report of Work Number)*
Mitchell Township	Nuinsco Resources Ltd. (Confederation South Property)	2000	Pr, Samp, Assays	2.20427 (60-2000)
Pakeagama Lake Area	Houston Lake Mining Inc. (Pakeagama Lake Rare Metals Property)	1999	Samp, GL, Assays	2.20468 (63-2000)
South of Otter Lake Area	Twomey, T.J. (Moose Creek Property)	1998	Lc, DEEP-EM, BEEP, Assays, Enzyme Leach Geochem	OP98-342

**Corresponds to Resident Geologist Office file designation*

In order to improve access to capital for small exploration companies and stimulate exploration in Ontario, the Government of Ontario will be proposing amendments to the Income Tax Act (Ontario) in the spring of 2001 to allow a tax credit to Ontario taxpayers of 5% of eligible Ontario grassroots exploration expenses (*news release, Ministry of Northern Development and Mines, December 6, 2000*). This is in addition to previously announced 50% reduction in the Mining Tax rate, and a ten year mining tax exemption for new remote mines opened after January 1, 2001 (after which time their profits will be taxed at only 5%).

An all-season road project was proposed by the Keewaytinook Okimakanak (Northern Chiefs Council) and the Sandy Lake First Nation *(The District News, September 6, 2000)*. At an estimated cost of $200 million, the approximately 410 km of road would link First Nation communities as far north as Sandy Lake with the existing Nungesser Road north of Red Lake. When completed, this road system would open up a vast area of the Berens River and Sachigo subprovinces to mining exploration.

Red Lake Greenstone Belt

Consolidated Westview Resource Corporation released results from its four hole, 1100 m diamond drilling program completed in December, 1999 on its Bateman Township property (3). Two of the holes encountered strongly carbonatized, silicified and quartz veined mafic volcanic rocks with weak to moderate pyrite mineralization, felsic dikes and oxide facies iron formation. Highest assay was intersected in hole EB-99-001, from 121.95 m to 123.1 m, returning 1.83 g/t gold over 1.15 m (*Canada Stockwatch, Feb. 8, 2000*). The geophysical target tested by these two holes is thought to represent less magnetic rocks infolded into the East Bay Serpentinite and deformation zone. Consolidated Westview dropped its option on the property and returned it to the vendor in November 2000 (*Mark Simpson, Consolidated Westview Resource Corporation, personal communication, January 2001).*

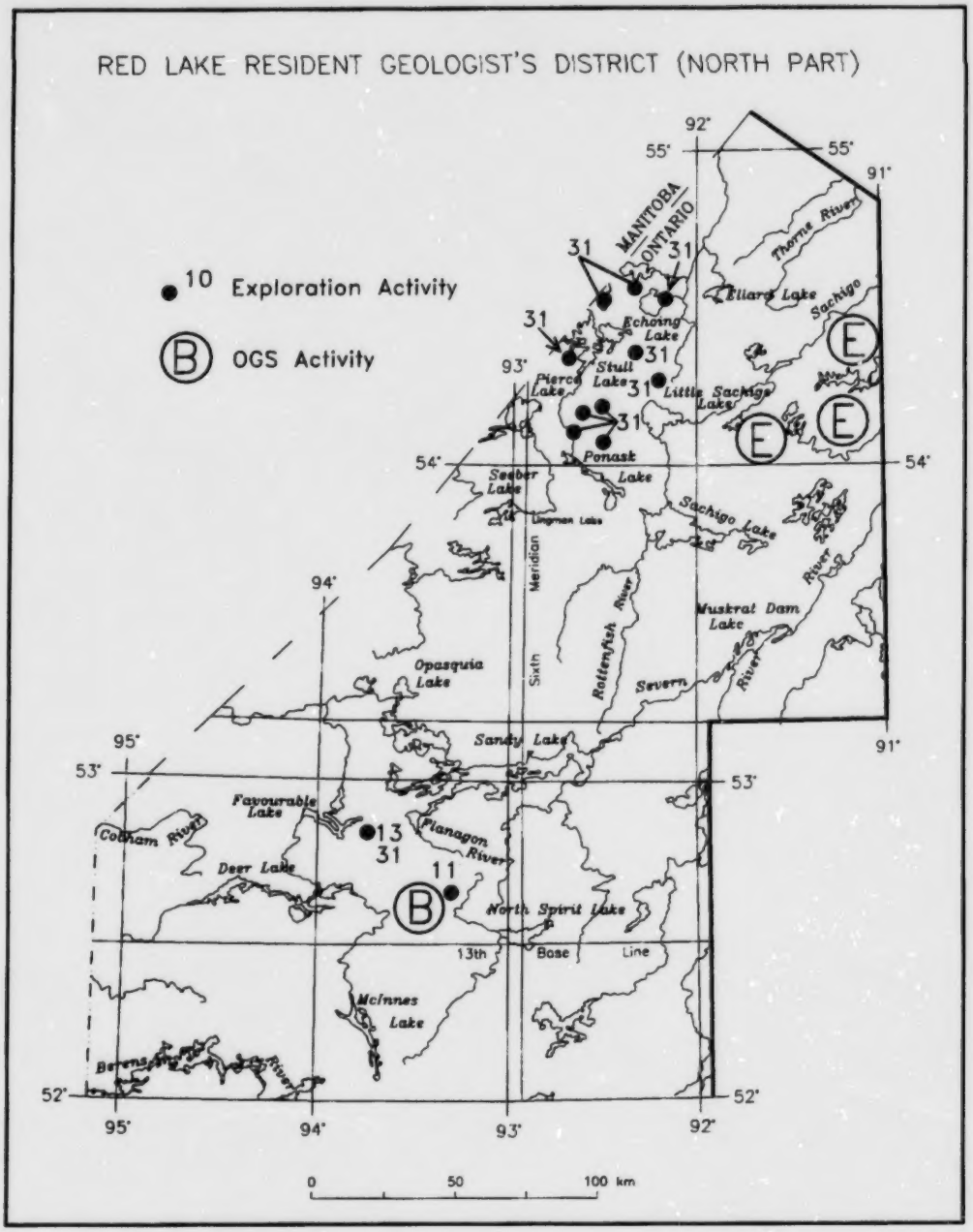


Figure 2. Red Lake District (north part): exploration and OGS activity.

Table 4. Exploration activity in the Red Lake Resident Geologist District in 2000.

Abbreviations

AEM ..... Airborne electromagnetic survey
AM ..... Airborne magnetic survey
ARA ..... Airborne radiometric survey
Beep ..... Beep Mat survey
Bulk ..... Bulk sampling
DD ..... Diamond drilling
DDH ..... Diamond drill hole(s)
DGP ..... Down-hole geophysics
GC ..... Geochemical survey
GEM ..... Ground electromagnetic survey
GL ..... Geological Survey
GM ..... Ground magnetic survey
GRA ..... Ground radiometric survey
Grav ..... Gravity survey
HLEM ..... Horizontal loop electromagnetic survey
HM ..... Heavy mineral sampling
IM ..... Industrial mineral testing and marketing
IP ..... Induced polarization survey
Lc ..... Linecutting
MMI ..... Mobile Metal Ion soil sampling survey
OD ..... Overburden drilling
ODH ..... Overburden drill hole(s)
OMIP ..... Ontario Mineral Incentive Program
OPAP ..... Ontario Prospectors Assistance Program
PEM ..... Pulse electromagnetic survey
PGM ..... Platinum group metals
Pr ..... Prospecting
RES ..... Resistivity survey
Samp ..... Sampling (other than bulk)
Seismic ..... Seismic survey
SP ..... Self-potential survey
Str ..... Stripping
Tr ..... Trenching
UG ..... Underground exploration/development
VLEM ..... Vertical loop electromagnetic survey
VLFEM .... Very low frequency electromagnetic survey

No	Company/Individual (Occurrence Name) or Property	Township/Area (Commodity)	Exploration Activity
1	Ansil Resources Ltd. (Adams Lake Area Property)	Ranger Township (Au)	MMI
2	Claude Resources Inc. (Madsen Mine)	Baird Township (Au)	UG
3	Consolidated Westview Corp. (East Bay Property)	Bateman Township (Au)	GL, Samp, Pr
4	Crawford, D. (Sandy Creek Property)	Camping Lake Area (Rare Metals)	Pr, Samp
5	Cypress Development Corp (Baird Township Property)	Baird Township (Au)	DDH(7)=1000 m
6	Cypress Development Corp. (McKenzie Island Property)	Dome Township (Au)	Lc, GM (2.20461) GL, Samp
7	Goldcorp Inc. (Cochenour-Willans, Slate Bay, East Bay Properties)	McDonough and Bateman Townships (Au, BM)	Lc, MMI
8	Goldcorp Inc. (Gullrock/Chukuni Property)	Byshe Township (Au)	Lc, MMI
9	Goldcorp Inc. (Trout Bay Prospect)	Ball and Mulcahy Township (Pd, Pt, Ni, Cu)	DDH (6)=2012 m, Lc, Str, Samp, GL, MMI, AEM, AM, ARA
10	Goldcorp Inc. (Red Lake Mine Property)	Balmer Township (Au)	DDH(6)=14,476.7', Assays (2.20365) AEM, AM, ARA, MMI

No	Company/Individual (Occurrence Name) or Property	Township/Area (Commodity)	Exploration Activity
11	Houston Lake Mining Inc. (Pakeagama Lake Rare Metals Property)	Pakeagama Lake Area (Rare Metals)	GL, Samp, Assays
12	Jonpol Explorations Ltd./ Wolfden Resources Ltd. (Birch Lake Intrusive Property)	Casummit and Satterly lakes areas (Pd, Pt, Au, Ag, Ni, Cu)	DDH(2)=?, Assays, Lc, Samp, Ground Geophysical Surveys
13	Jonpol Explorations Ltd./ Wolfden Resources Inc. (Borthwick Lake Property)	Setting Net Lake Area (Au, Pd, Pt)	Pr, Samp
14	Kafka Granite LLC. (P. English Quartz Property)	Corless Township (Decorative Aggregate)	Samp, Str
15	Maciejewski, A.J.	Ball Township (Au)	Str, Tr, Samp, Assays (2.20537)
16	Melville, R.	Ball Township (Dimension Stone)	Pr, Samp, Assays, Lc (2.20560)
17	Nuinsco Resources Ltd. (Belanger Property)	Belanger Township (BM)	Lc, PEM (2.20382)
18	Nuinsco Resources Ltd. (Confederation South Property)	Mitchell Township (Cu, Zn, Au, Ag,)	Pr, Samp, Assays (2.20427)
19	Nuinsco Resources Ltd. (South Bay Property)	Mitchell Township (BM)	DDH(2)=983.2 m
20	Quedent, O.	Gould Lake Area (Rare Metals)	Samp, Assays
21	Rivard, D. (Heath Property)	Todd Township (Au)	Surface Work
22	Rivard, O. (Cross Island Property)	Bateman Township (Au)	DD
23	Royal Roads Corp. (Adams Lake Gold Property)	Balmer Township (Au)	GM, VLF (2.20371) DDH(3)=750 m, Samp, Assays (2.20718) Gradient TDIP Survey (2.20614) Pr, GL
24	Rubicon Minerals Corporation (McCuaig Property)	Dome Township (Au)	Lc
25	Rubicon Minerals Corporation (Norseman Property)	Black Bear and Coli lakes Area (Au)	Lc, GM, VLF-EM
26	Rubicon Minerals Corporation (Peterson Property)	Balmer Township (Au, As, Ag, Cu, Pt, Pd)	DD(2)=873.6 m, Samp, Assays (Whole Rock) (2.20733)
27	Rubicon Minerals Corporation (Red Lake Property - Slate Bay)	McDonough Township (Au, Cu)	Str, Tr (2.20713) Samp, Assays (Whole Rock) (2.20751)
28	Rubicon Minerals Corporation/Anglo Gold (Canada) Exploration Company (Red Lake Greenstone Belt)	Red Lake Greenstone Belt (Au)	AEM, AM (using Anglo's SPECTRUM multi-frequency system)

No	Company/Individual (Occurrence Name) or Property	Township/Area (Commodity)	Exploration Activity
29	Rubicon Minerals Corporation (West End of Red Lake Property)	Ball Township (Au, PGE)	Samp, Pr
30	Wolfden Resources Inc. (Argosy Gold Mine Property)	Casummit Lake Area (Au)	Lc, GM, VLF-EM (2.20036) Samp
31	Wolfden Resources Inc.	Bonnell, Gilleran, Passmore, Rorke, Setting Net and Warnock lakes, Ponask River, Richardson Arm of Stull Lake areas	Staking

Goldcorp Inc. significantly increased its land base in the Red Lake mining camp by an extensive staking campaign (over 5000 units) adjacent to most of its existing properties. Surface exploration programs on its extensive land holdings in the Red Lake mining camp included:

- MMI sampling on Trout Bay (Ball and Mulcahy Twps.) (9), Rowan (Todd Twp.), East Bay and Forsyth (Bateman Twp.) (7), Slate Bay (McDonough Twp.) (7) and the Chukuni-Gullrock (Balmer and Byshe Twps.) (8) properties; in addition to the Red Lake Mine property itself (Balmer Twp.) (10);
- approximately 500 km of lines were cut over Trout Bay, Slate Bay, East Bay, Forsyth and Chukuni-Gullrock properties;
- approximately 4000 km of airborne surveys (VLF, Mag, EM and radiometrics) were flown by Sial Geosciences Inc. over the properties in Ball, Mulcahy and Todd townships and over the Red Lake Mine property in Balmer Township.

Significant palladium and nickel values (7.07 g/t Pd and 7.08% Ni; *news release, Goldcorp Inc., July 10, 2000*) were obtained from grab samples of surface exposures of tremolite-antigorite-magnetite altered ultramafic sill on the Trout Bay property. This sill hosts the Trout Bay nickel-copper prospect (approximately 122 m long and 10 m wide, grading 0.50% Ni and 0.25% Cu) that was discovered by Cochenour-Willans Gold Mines Ltd. in 1956 (Riley 1968). Extensive road rehabilitation and construction early in the year facilitated linecutting, stripping and power washing of outcrops. Detailed structural mapping and channel sampling led to a six hole, 2012 m diamond drill program completed in December. Assay results were pending at the time of writing.

Cypress Development Corporation completed a seven hole, 1000 m diamond drilling program on its Baird Township property (5) designed to test several IP anomalies. Carbonatized mafic volcanic rocks with numerous quartz-carbonate veins and veinlets were encountered. Linecutting, mapping, sampling and a magnetometer survey were carried out on the McKenzie Island property in Dome Township (6). The claims are underlain by carbonatized ultramafic rocks and metasedimentary rocks, and cut by quartz-carbonate veining. Assays were pending at time of writing.

Royal Roads Corporation carried out ground magnetometer and VLF-EM surveys, Quantec Real Time IP survey, geological mapping and a three hole 739 m diamond drill program on their Adams Lake gold property in Balmer Township (23). This property is under option agreement from Rubicon Minerals Corp. The geophysical surveys delineated two coincident magnetic and electromagnetic anomalies. Each

diamond drill hole intersected several sulphide iron formation sections mineralized with pyrrhotite and pyrite with traces of arsenopyrite, chlacopyrite and sphalerite. The bulk of the rock in each hole was massive mafic metavolcanic rocks. Gold assays were low in spite of abundant sulphide minerals. The best intersection was 1.2g/t gold over 1.16 m.

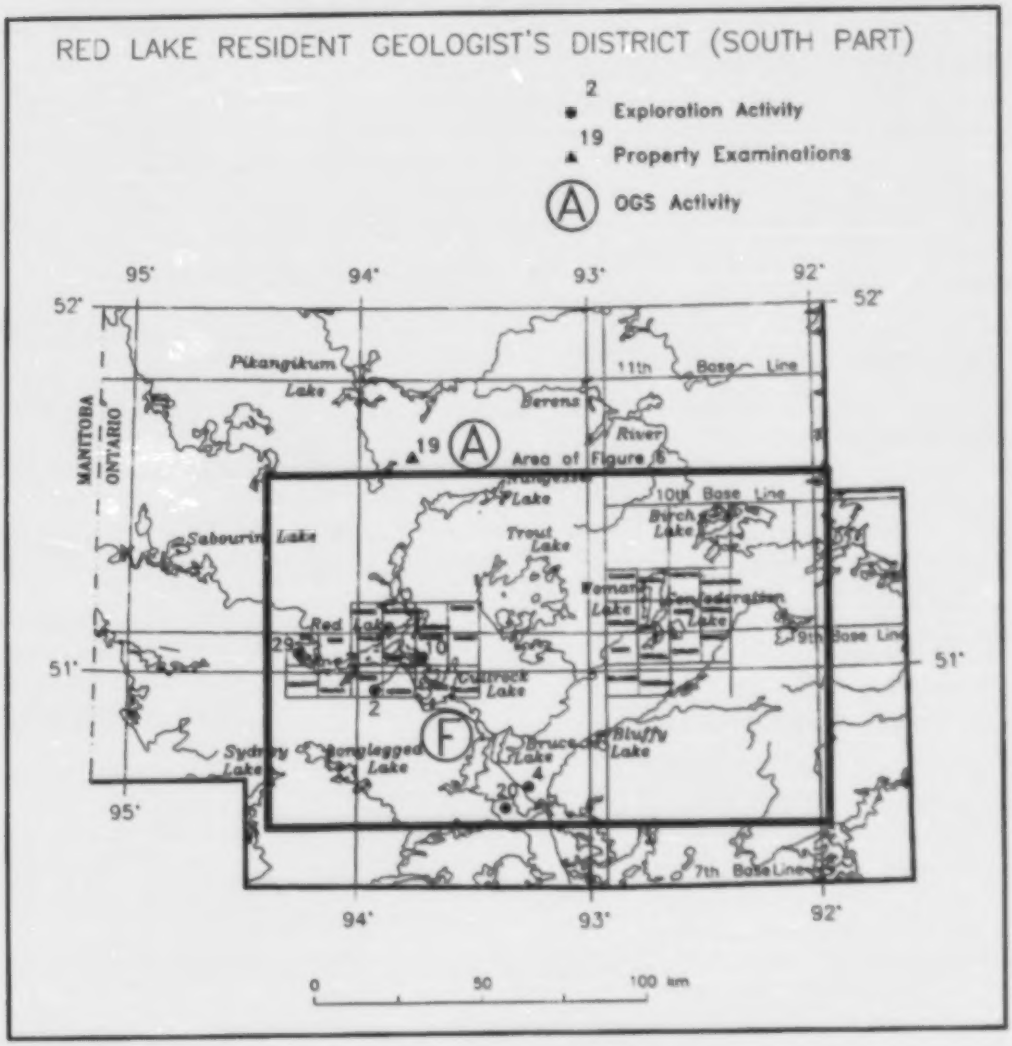


Figure 3. Red Lake District (south part): location map, exploration activity and property examinations.

Rubicon Minerals Corporation controls an extensive land package in the central part of the Red Lake greenstone belt. Their primary exploration target has been high grade gold mineralization but recent platinum group metal (PGM) discoveries in the Red Lake greenstone belt has added PGM mineralization to their exploration targets. Rubicon increased their land holdings by 370 claims in the western end of the

Red Lake belt (29) covering seven PGM occurrences and associated gabbroic rocks near the Goldcorp Inc. PGM discovery (*press release, Rubicon Minerals Corporation, July 13, 2000*). Preliminary sampling work on these claims was carried out in 2000, these claims have gold potential as well as PGE potential (*D. Adamson, Rubicon Minerals Corporation, written communication, 2001*).

In addition to the PGM property Rubicon's interests in the Red Lake belt include its core gold project in the central part of the Red Lake belt and its:

- McCuaig project (24),
- Peterson property (26),
- Slate Bay property (27),
- the Norseman property (25), and
- the 116 claim Adams Lake property currently under option to Royal Roads Corporation (29).

Rubicon Minerals Corp. announced that it signed a formal agreement with AngloGold (Canada) Exploration Company to joint venture its Red Lake gold project (28). The Red Lake Joint Venture is approximately 1300 claim units extending from the central part of the Red Lake greenstone belt to the Coli Lake area in the northeast of the Red Lake belt. The agreement calls for AngloGold to make an initial contribution of US$3 million over 5 years to earn a 60% interest including a firm commitment to spend US$300 000 by January 24, 2001 (*press release, Rubicon Minerals Corporation, May 11, 2000*). As part of this agreement an airborne geophysical survey was flown over 250 square kilometres of the Red Lake greenstone belt (*press release, Rubicon Minerals Corporation, December 4, 2000*). Ground surveys, stripping, trenching and sampling were carried out on various parts of the Rubicon-Anglogold joint venture property, the Slate Bay property and the McCuaig property during 2000. Detailed geological mapping following up on the 1999 stripping was carried out on the McCuaig property. Work on the Slate Bay property comprised stripping, power washing, trenching, geological mapping and sampling. The work exposed east-northeast striking intercalated metasandstone and metaconglomerate cut by numerous north to northeast striking quartz tourmaline veins and veinlets and quartz stockwork. Sampling of these veins returned numerous anomalous gold assays often accompanied by anomalous copper values (Cu up to 8600 ppm) (*assessment files, Resident Geologist's Office, Red Lake*). Sampling results returned 3.44 g/t Au over 21.85 m including 5.60 g/t Au over 6.1 m from a chip sample and 1.14 g/t Au over 36.93 m from a parallel channel sample located 7 m to the northeast of the chip sample (*press release, Rubicon Minerals Corporation, January 23, 2001*).

In April, Rubicon Minerals Corporation carried out a two-hole 873.6 m diamond drill program on its Peterson property optioned from Peterson Red Lake Mines Ltd. Historically this property contains local high grade gold mineralization (13.71 g/t over 0.3 m and 106.6 g/t over 0.12 m) within an extensive zone of lower grade gold mineralization (*Canada Stockwatch, April 3, 2000*). Both holes intersected highly altered rocks and a distinctive quartz-sulphide zone. The first hole (CP2000-03) intersected iron formation underlain by mafic metavolcanic rocks, altered quartz-feldspar porphyry and minor mafic intrusive rocks. The second hole (CP2000-04) located southeast of CP2000-03, intersected talcose ultramafic rocks and altered mafic metavolcanic rocks and the quartz-sulphide zone. The ultramafic rocks at the Peterson property are believed to be similar to those developed at the Campbell (Placer Dome Inc.) and Red Lake (Goldcorp Inc.) mines. Broad zones of anomalous gold were intersected, with a maximum value of 2610 ppb over 0.39 m. Gold mineralization occurs in altered iron formation. Alteration in the iron formation consists of garnet, grunerite and sulphides (pyrite, chalcopyrite, arsenopyrite and pyrrhotite). Gold is also present in distinctive quartz sulphide zones up to 12.5 m thick close to the contact between mafic and ultramafic units. A maximum of 1025 ppb Au over 12.5 m was returned from these units (*press release, Rubicon Minerals Corporation, June 6, 2000*). In June, Rubicon Minerals Corp. announced that anomalous Pt and Pd were found in 7 pulps selected for Pt and Pd analysis

from this diamond drill project. The highest value is 1155 ppb Pd from the upper contact of a 0.91 m wide mafic dike. The current data indicate anomalous Pt and Pd in mafic intrusive rock and iron formation (press *release, Rubicon Minerals Corporation, June 6, 2000*).

Birch-Confederation-Uchi Greenstone Belt

Nuinsco Resources Limited carried out work on three properties in the Confederation Lake area. Their Belanger Township property (17) is located primarily in the northeast corner of Belanger Township. Their Confederation South (18) and South Bay (19) properties are located in Mitchell Township close to the past producing South Bay Mine.

Nuinsco optioned the Belanger property in 1999. In 2000, they carried out linecutting and a Pulse-EM survey to investigate two airborne anomalies and a stringer sulphide showing. The results of this survey did not indicate the presence of potentially economic sulphide minerals and the property was returned to the vendor. A two-hole 983.2 m diamond drill program was carried out on the South Bay property in Mitchell Township optioned from Greg Campbell and Don Hawke. The deepest hole (764.2 m), started in massive basalt, intersected disseminated and stringer sulphide mineralization consisting of pyrrhotite and minor sphalerite and chalcopyrite. A zone of chlorite alteration from 315 m to 345 m carried a higher sulphide content (up to 15%). The best mineralized zone assayed an average of 7169 ppm Zn over 19.85 m including a zone of 1.81% Zn over 4.15 m. Below 440 m this hole intersected bedded fragmental rocks with intercalated sulphide rich units. A section of this material averaged 2265 ppm Zn over 53.4 m and another section assayed 4253 ppm Zn over 6.7 m including 4.21% Zn over 0.45 m and 2.2% Zn over 0.4 m the hole ended in less altered basalt (*Greg Campbell, prospector, written communication, 2001*). The second hole intersected black, glassy rhyodacite or rhyolite cut by minor porphyry dikes and containing a number of barren 15-30 cm interflow sediment units. Nuinsco has since dropped their option on this property (*Greg Campbell, prospector, written communication, 2001*). Nuinsco carried out a prospecting and limited sampling program (grab samples) on their Confederation South property in Mitchell Township which they still retain. One grab sample of sulphide bearing schistose rock that appeared to be interflow sediment returned 2.62% Zn and 0.26% Cu.

Wolfden Resources Inc. and **Jonpol Explorations Ltd.** conducted a two hole diamond drill program on their Birch Lake Intrusive property (12). This property has both PGE and gold potential. Drill Hole No. BR-01, was drilled to intersect gabbro located 500 m north of a previous PGE drill intersection located beneath Birch Lake. Low PGE and gold values were encountered in this hole. Drill Hole No. BR-02, drilled to intersect a geophysical anomaly with an associated 360 ppb gold in soil anomaly, intersected three new gold bearing zones assaying 1.72 g/t Au over 3 m, 4.11 g/t Au over 1.5 m and 1.84 g/t Au over 3 m (*press release Wolfden Resources Inc., August 11, 2000*). An untested, 900 meter long, gold in soil anomaly assaying as high as 1.11g/t Au with an associated IP conductor lies only 300 m to the north of Hole BR-02. There is no outcrop in the area of this soil anomaly, but grab samples of sericite schist host rocks from nearby outcrops have assayed as high as 39.0 g/t Au (*press release, Wolfden Resources Inc., August 11, 2000*). The main PGE target and the untested soil/IP zone will be drill tested in January 2001 (*Ewan Downie, Wolfden Resources Inc., personal communication, 2001*).

Wolfden Resources Inc. carried out ground magnetic and VLF-EM surveys plus limited sampling at the Argosy Mine property at Casummit Lake (30)(*assessment files, Resident Geologist's Office, Red Lake*).

Northern Greenstone Belts

Houston Lake Mining Inc. holds two rare-metal pegmatite properties along the Bearhead Fault, a 140 km long, northwest-striking feature which separates the Berens River and Sachigo Subprovinces. The

Pakeagama Lake property (11) is 160 km north of Red Lake, while the Favourable Lake property is 60 km farther to the northwest of Pakeagama Lake, along the fault zone. The company continued sampling and detailed geological mapping on their Pakeagama Lake property. Further exploration including ground geophysical surveys and diamond drilling is planned for 2001 (*E. Grayme Anthony, Houston Lake Mining Inc., personal communication, 2001*). The Pakeagama Lake property has been subject to extensive work by F.W. Breaks of the Ontario Geological Survey (Breaks, Tindle and Smith 1999). The property is underlain by foliated, coarse-grained to pegmatitic, peraluminous muscovite-biotite granite of the Pakeagama Lake pluton, which intrudes the metavolcanic rocks and metasedimentary rocks of the North Spirit Lake greenstone belt. The Pakeagama Lake rare-metal pegmatite is situated within the northwestern end of the Pakeagama Lake pluton. The pegmatite is a complex-type, petalite-subtype pegmatite with well-developed internal zoning. The pegmatite zones below have been described by Houston Lake Mining Inc. (*www.houstonlakemining.com*):

1. Quartz-rich wall zone contains a mineralogy of quartz-montebrasite-potassium feldspar-muscovite-green tourmaline.
2. Potassium feldspar-rich pegmatite zone displays a mineralogy composed of potassium feldspar-petalite-quartz-green tourmaline.
3. Spodumene-quartz-rich core zone contains spodumene-quartz-montebrasite-green tourmaline.
4. Petalite-potassium feldspar pegmatite zone is represented by a mineralogy of potassium feldspar-petalite-quartz.
5. Layered spodumene pegmatite-aplite zone contains a mineral assemblage of spodumene-albite-quartz.

Channel sampling of the 13 metre wide Northern Wall Zone of the Pakeagama Lake pegmatite returned 344 g/t Ta_2O_5, 0.90% Rb_2O, 1776 g/t Cs_2O, 68.9 g/t Sn, 131.9 g/t Nb_2O_5, 1.34% Li_2O, 25.9 g/t Tl, and 42.2 g/t Ga over 11 metres. Germanium and beryllium results are pending (*press release, Houston Lake Mining Inc., Nov 21, 2000*). Sampling of a tantalum bearing aplite on the shore of Pakeagama Lake (300 metres along strike to the southeast) returned 642 g/t Ta_2O_5, 0.09% Rb_2O, 408 g/t Cs_2O, 6.5 g/t Sn, 64.1 g/t Nb_2O_5, 0.03% Li_2O, 6.5 g/t Tl, and 44.9 g/t Ga. This suggests that the Pakeagama Lake rare metal pegmatite and associated rare metals mineralizing system has a strike length of 560 metres and is open in both directions along strike (*press release, Houston Lake Mining Inc., Nov 21, 2000*).

The company has the option to earn a 100 per cent interest in the Favourable Lake Rare Metals Property which is located about 200 km north of Red Lake and 60 km to the northwest of the Pakeagama Lake pegmatite. The property geology consists mainly of coarse grained to pegmatitic muscovite-biotite granite which intrudes between the granitic to granodioritic Severn batholith to the north and metasedimentary rocks of the Favourable Lake greenstone belt on the southern edge of the property. No work was carried out on this property in 2000 but prospecting and exploration is planed for 2001 (*E. Grayme Anthony, Houston Lake Mining Inc., personal communication, 2001*).

Wolfden Resources Inc. and joint venture partner **Jonpol Explorations Ltd.** carried out prospecting and sampling at their Borthwick Lake Property (13), located north of Red Lake (*Ewan Downie, Wolfden Resources Inc., personal communication, 2001*). The Borthwick Lake Property is host to a layered ultramafic intrusive complex that contains copper-nickel mineralization. As a follow-up on a recent discovery of kimberlite indicator minerals in the Stull Lake area by the Ontario Geological Survey, the partners acquired 15 claim blocks (31) which cover airborne geophysical anomalies that may represent kimberlite pipes (*press release, Wolfden Resources Inc., August 11, 2000*). Exploration on Wolfden's Little Stull Lake and Monument Bay properties on the Ontario-Manitoba border was all on the Manitoba portion. No work was carried out at their Lingman Lake property *(Ewan Downie, Wolfden Resources Inc., personal communication, 2001*).

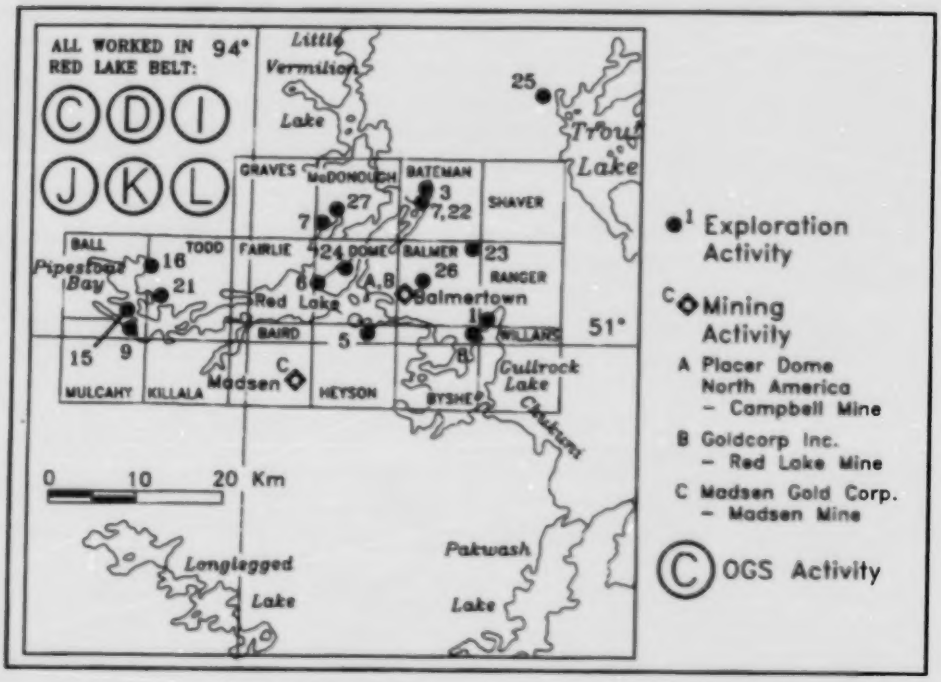


Figure 4. Red Lake greenstone belt: mining, exploration and OGS activity.

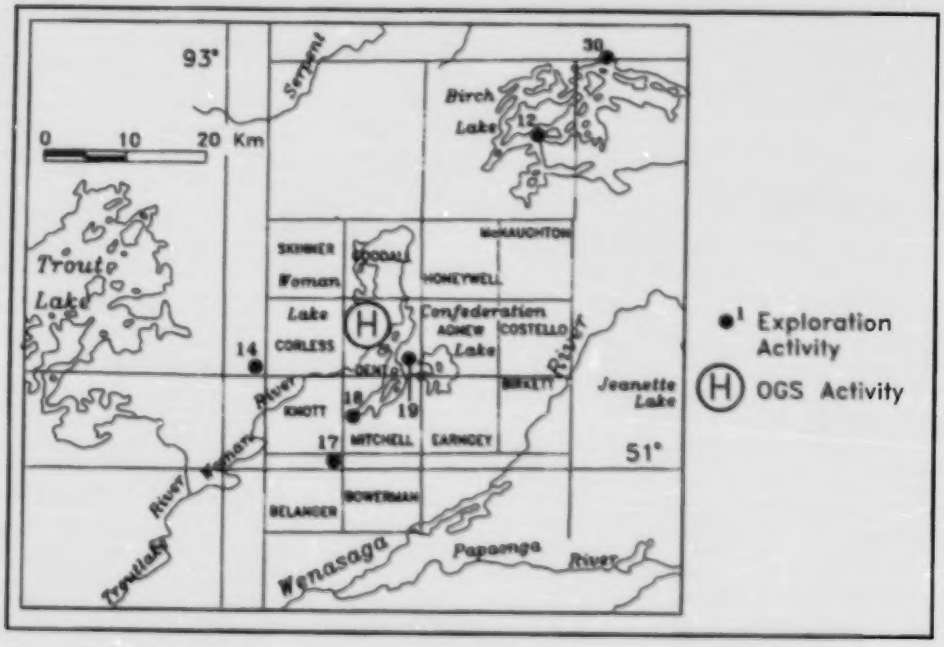


Figure 5. Birch-Confederation-Uchi greenstone belt: exploration and OGS activity.

RESIDENT GEOLOGIST STAFF AND ACTIVITIES

The staff of the Red Lake office started the year with Carmen Storey, Acting Regional Resident Geologist, Susie DM. Gosselin Acting District Geologist and Lynn Kosloski as District Support Geologist. This situation lasted until March 31, when the people in acting positions reverted to their home positions. The Regional Resident Geologist position was filled by Andreas Lichtblau in August. At the end of 2000, the office staff comprised Andreas Lichtblau, Regional Resident Geologist, Carmen Storey, District Geologist and Lynn Kosloski, District Support Geologist. Kara Parkhurst was employed as field and office assistant on the Summer Experience Program.

Drill Core Storage Site

In the year 2000, there were 22 users of the Red Lake remote drill core storage site. Diamond drill core from two drill projects was donated and added to the collection, totaling 3081.7 m from 6 holes.

Details on the donated diamond drill core, are as follows:

- Four holes totaling 2889.84 m, drilled in 1996, by Barrick Gold Corporation on their Hasaga Property in Heyson Township. Total length of these holes, including overburden, was 2897.7 m.

- Two holes totaling 177.9 m, drilled in 1999, by Ansil Resources Ltd. on their Baird Township Property. Total length of these holes, including overburden, was 184 m.

Land Use Planning

Staff of the Red Lake office contributed to *Ontario's Living Legacy* initiative at various times through the year. Staff also attended public consultation and information sessions for Forest Management Agreements and the new Red Lake Official Plan. Review of the Red Lake Official Plan was started in conjunction with Abraham Drost (RLUG) and completed in January 2001. Six consent applications, one minor variance and one amendment to the Ear Falls official plan were handled until the Regional Land Use Geologist (RLUG) positions were established.

PROPERTY EXAMINATIONS

Table 5. Property visits conducted by the Red Lake Regional Resident Geologist and Staff in 2000

Number (keyed to Figures 3 and 6)	Property/Occurrence
1	Onnie Lake, Mulcahy Township
2	Campbell Mine, Balmer Township
3	New Faulkenham Mine, Baird Township
4	Pine Ridge Road PGE Reconnaissance, McDonough Township
5	Mount Jamie Mine, Todd Township
6	Lake Rowan Mine, Todd Township
7	Red Crest Mine, Todd Township
8	West Red Lake Mine, Ball Township

Number (keyed to Figures 3 and 6)	Property/Occurrence
9	Pipestone Bay of Red Lake, Ball Township
10	Rubicon Minerals Corp. - Dorion Island, Dome Township
11	Rubicon Minerals Corp. - McKenzie Island, Dome Township
12	Jackson-Manion South Property, Mitchell Township
13	Corless Road Quartz Vein, Little Bear Lake Area
14	Joyce Road - Road A Reconnaissance, Skinner Township
15	Joyce Road - Road B PGE Reconnaissance, Skinner Township
16	Griffith Mine, Bruce Lake Area
17	Gold Eagle Mine, Dome Township
18	Madsen Mine, Baird Township
19	Nungesser Road, Sanukitoid Reconnaissance, Kirkness Lake Area
20	Sidace Lake Road, Sanukitoid Reconnaissance, Nungesser Lake Area
21	Pakwash Lake Area, Sanukitoid Reconnaissance, Bruce Lake Area
22	Trout Bay Ni-Cu-PGE Occurrence, Mulcahy Township
23	O'Brien Rivard, Bateman Township

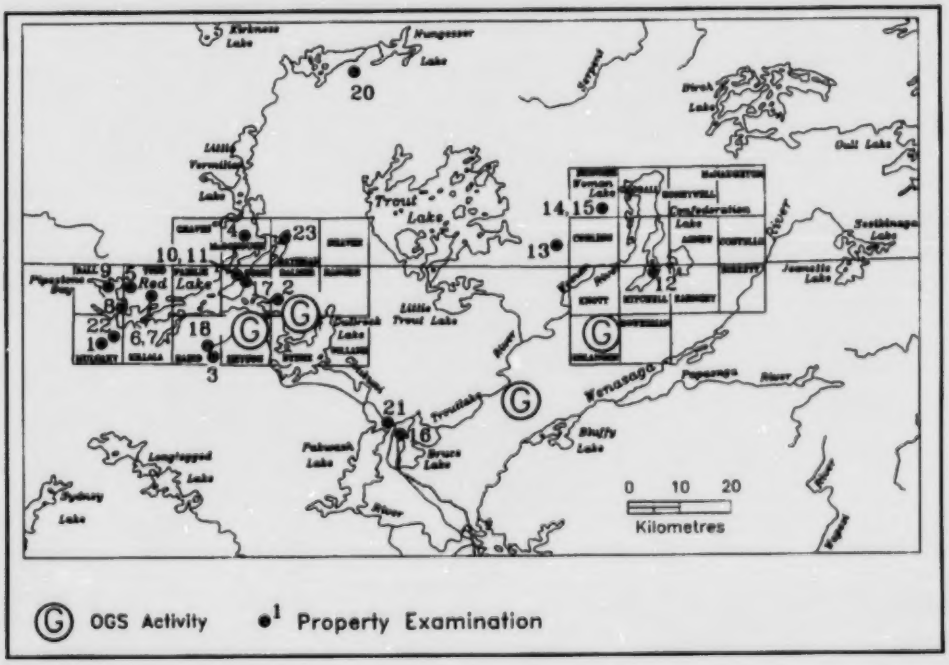


Figure 6. Property examinations, OGS and other research activity.

New Faulkenham (C.C. Storey)

The New Faulkenham Mines Ltd. property is located in Baird Township 1050 metres south-southwest of the community of Starrett-Olsen and the past producing Starrett-Olsen Mine. An old road extends from the Starrett-Olsen townsite approximately 2150 m to the New Faulkenham property. The property is part of the land package obtained from Madsen Gold Corp and held by Claude Resources Ltd.

The area has been mapped by Horwood (1945), Ferguson (1965) and Wallace and Atkinson (1993). Horwood describes the mine when it was operating prior to 1940. The area is underlain by east-northeast striking intermediate to felsic rocks mapped as fragmental by Ferguson (1965) and Wallace and Atkinson (1993). Recent work by the GSC and OGS has grouped these rocks with the Confederation Assemblage (Parker 1999). Very similar felsic fragmental rocks are exposed on Highway 618 at Madsen. The Faulkenham Lake Stock, a granodiorite to quartz diorite body, intrudes the metavolcanic rocks approximately 1 km to the northeast. Numerous granitoid dikes intrude the rocks exposed on the New Faulkenham property.

During the 1930's the property was explored by a shaft 344 feet deep with levels at 125, 225 and 325 feet, with a total of 1445 feet of drifts and crosscuts. There are published reserves of 15 000 tons of 0.428 ounce per ton gold (Holbrooke 1958). No production was recorded from this site but an ore dump was left at the shaft. This material was milled at the Madsen mill by Madsen Gold Corp. A series of old trenches, pits and stripped areas on a property scale map by Horwood (1945) show the main vein exposed for 900 feet and two more veins to the north exposed for 125 and 60 feet each. The main vein strikes 107° and dips 85°N (Horwood 1945). The vein pinches and swells with a maximum reported width of 24 inches. Undergound the vein is similar, Horwood reports grades of 0.362 ounce per ton gold over an average width of 16.75 inches for 41 feet of strike length. A second lens shaped vein, averaging 8 inches wide, in a silicified shear zone with many narrow quartz lenses and stringers returned 0.338 ounce per ton gold over the average width of the drift. Work done in 1936 and 1937 failed to trace the vein system below the 325 level. Figure 7 shows the location of pits and veins on the property.

The host rock exposed at the surface is sheared dark grey feldspar porphyry, at least in part a felsic crystal tuff, similar in appearance to felsic rocks exposed on Highway 618 at Madsen. The rock at New Faulkenham contains feldspar phenocrysts but no quartz phenocrysts and is more highly deformed. Flattened wispy fragments appear on the weathered surface. The foliation is visible but not intense enough to make the rock schistose. Biotite is present in the foliation surfaces. A trace amount of euhedral pyrite is present. This rock appears to be at a somewhat higher metamorphic grade than the Highway 618 exposures. A sample of this rock from the large outcrop area east of the shaft was analyzed for major elements, the results are in Table 7. Mapping by Ferguson (1965) and Wallace and Atkinson(1993) shows an east striking granodiorite dike immediately south of the main vein zone. The granodiorite, common in the waste dump, is fine-grained, pink to deep pink in colour and has biotite as the mafic mineral phase. Epidote is present as veins cutting both rock types and as isolated clusters in the granodiorite. The granodiorite and feldspar porphyry form a sharp contact.

The main vein is white to light grey glassy quartz with variable amounts of pyrite and small amounts of chlacopyrite, sphalerite and galena. The host rock is silicified and also carries small amounts of sulphide minerals. Several samples of the vein and the host rock were assayed, results are in Table 6. With the exception of a host rock sample from Pit 1, the host rock samples assayed did not carry high gold values although they are anomalous. Samples from the remaining material from the ore dump (samples 2000CS008, 009, 009A, 009B, and 009C) showed variable gold values with the highest value being 3.94 ounces of gold per ton. These values are accompanied by high base metal assays, a common feature of other gold deposits in the Red Lake camp. The veins, as exposed in the shaft area trenches look quite

barren while the host is mineralized with small amounts of pyrite and other sulphides. Assays of several quartz vein samples indicated that this is not the case. In the area to the east of the shaft the host rock is not apparently mineralized but is still anomalous in gold. The veins were not examined beyond the area reported on by Horwood.

To the southwest towards ground currently held by Ansil Resources Ltd. an old pit sunk in rusty silicified rock, resembling the rock at the shaft area, returned 0.23 ounce per ton gold. The New Faulkenham veins are part of a sheared and altered zone striking 110° and varying in width and degree of alteration. Alteration consists of silicification and sulphidation accompanied by epidote veinlets and pink hematite staining. The widest and most well developed alteration being in the shaft zone.

The New Faulkenham property shows high gold grades but exploration to date has not proven economic tonnage. This type of deposit is still an attractive exploration target particularly if gold prices improve.

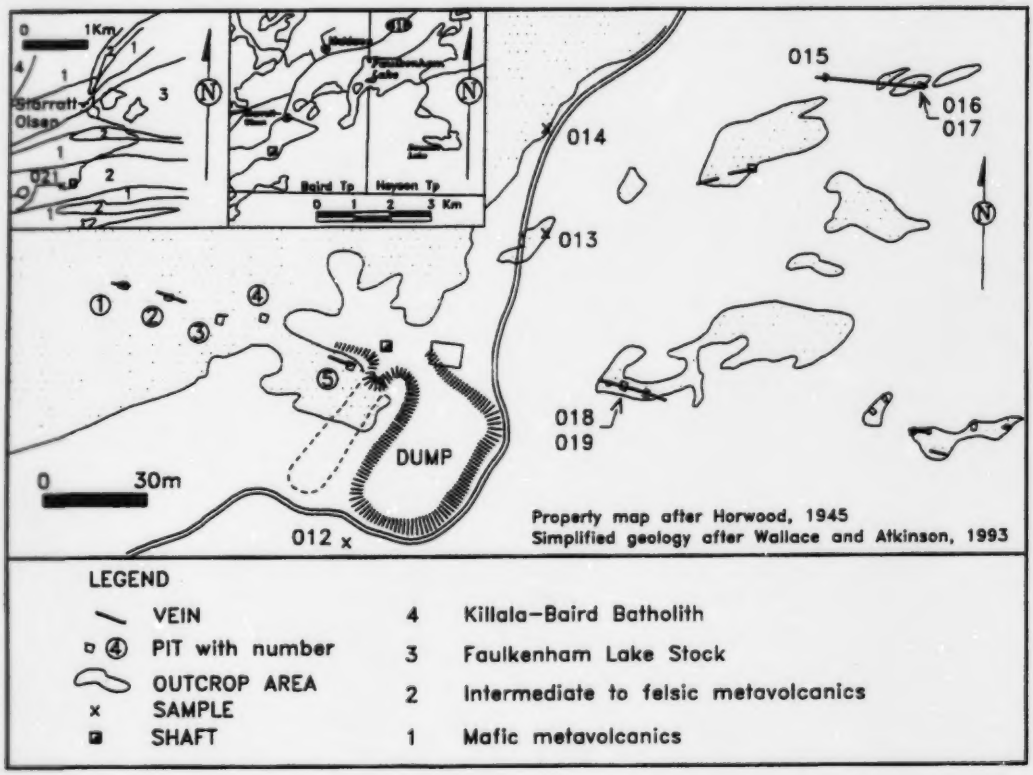


Figure 7. Workings and simplified geology of the New Faulkenham property.

Table 6. New Faulkenham assay results.

	Material	Au	Au	Ag	Ag	Cu	Pb	Zn	As
Units		ppb	opt	ppm	opt	ppm	ppm	ppm	ppm
Detection Limit		0.9	0.01	1	0.1	2	0.1	5	3.5
2000CS001	QV Pit 1	8.2	nd	-	nd	-	-	-	-
2000CS002	host Pit 1	12502.9	0.56	5	nd	342	142	649	nd
2000CS003	dump Pit1	14900.3	0.41	-	nd	-	-	-	-
2000CS004	rusty host Pit 2	3195.1	0.08	4	nd	190	29	70	19
2000CS005	QV Pit3	1156.9	0.03	-	nd	-	-	-	-
2000CS006	QV Pit3	895.1	0.01	-	nd	-	-	-	-
2000CS007	host Pit3	2210.3	0.05	4	nd	178	21	68	18
2000CS008	QV main dump	-	3.94	-	1.2	-	-	-	-
2000CS009	Ore dump	21188.2	1.24	97	3.6	1430	996	4784	7
2000CS009A	Ore dump	71782.5	0.60	18	nd	2412	72	954	22
2000CS009B	Ore dump	39455.3	3.22	27	nd	>1000	382	2584	12
2000CS009C	Ore dump	25067.4	0.87	20	nd	1224	603	598	9
2000CS010	QV Pit 5	4679.5	0.12	-	nd	-	-	-	-
2000CS011	dump Pit 5	2957.0	0.08	2	nd	511	4	9	nd
2000CS011A	dump Pit 5	4973.0	0.14	2	nd	316	12	50	nd
2000CS015	QV	85.5	nd	-	nd	-	-	-	-
2000CS016	QV	439.6	0.02	-	nd	-	-	-	-
2000CS017	host	356.9	0.04	3	nd	122	28	82	7
2000CS018	QV	3067.8	0.10	1	nd	90	29	32	nd
2000CS019	silicified wall rock	584.2	0.02	3	nd	175	79	270	9
2000CS021	dump old pit	593.6	0.23	2	nd	76	8	42	5

Pt and Pd are all < 3 ppb and most < 1 ppb, nd means not detected, - means not analyzed for, gold values > 1000 ppb are not reliable, all Au were redone by fire assay, nd in Au or Ag fire assay column indicates values too low to be detected by this method.

Table 7. New Faulkenham major element analysis.

	Al_2O_3	CaO	Fe_2O_3	K_2O	LOI	MgO	MnO	Na_2O	P_2O_5	SiO_2	TiO_2	TOTAL
Units	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%
Detection Limit	0.01	0.01	0.01	0.01	0.05	0.01	0.01	0.01	0.01	0.01	0.01	
2000CS-014	14.64	3.35	4.68	2.65	0.95	2.45	0.07	4.03	0.18	66.15	0.59	99.74

Jackson-Manion South (C.C. Storey)

The Jackson-Manion South property is located near the north boundary of Mitchell Township 73 km east of Red Lake and was formerly part of a much larger land package including the past producing J-M Consolidated Mine held by Orofino Resources Ltd. Access is by boat from Woman Lake.

Mitchell Township has been mapped by Pryslak (1970) and included in a compilation by Thurston (1984). The Jackson-Manion Mine (J-M Consolidated Mine) has been described by Harding (1936) and Bateman (1940). The property was the subject of major exploration program by Orofino Resources Ltd. in the 1980's (Zinn 1985). Exploration on the property began in 1926, mining activities at the J-M Consolidated Mine Belljoe and Rowe shafts took place between 1934 and 1940 with a total production of 27 146.18 ounces of gold and 18 299.76 ounces of silver from 105 357 tons of ore milled (average grade 0.258 ounce per ton gold) (Parker and Atkinson 1992). Zinn (1985) reports 25 455 ounces of gold and 12 865 ounces of silver from the same tonnage of ore. Evidence of old exploration activity is present all over the property, mapping by Zinn (1985) indicates many old pits and trenches in addition to the Belljoe and Rowe shafts and the contemporary work carried out by Orofino Resources Ltd. Exploration work by Orofino Resources Ltd. was concentrated on the area around the shafts and on the northern part of the property in Dent Township, little was done on the south (Mitchell Township) claims after the report by Zinn (1985).

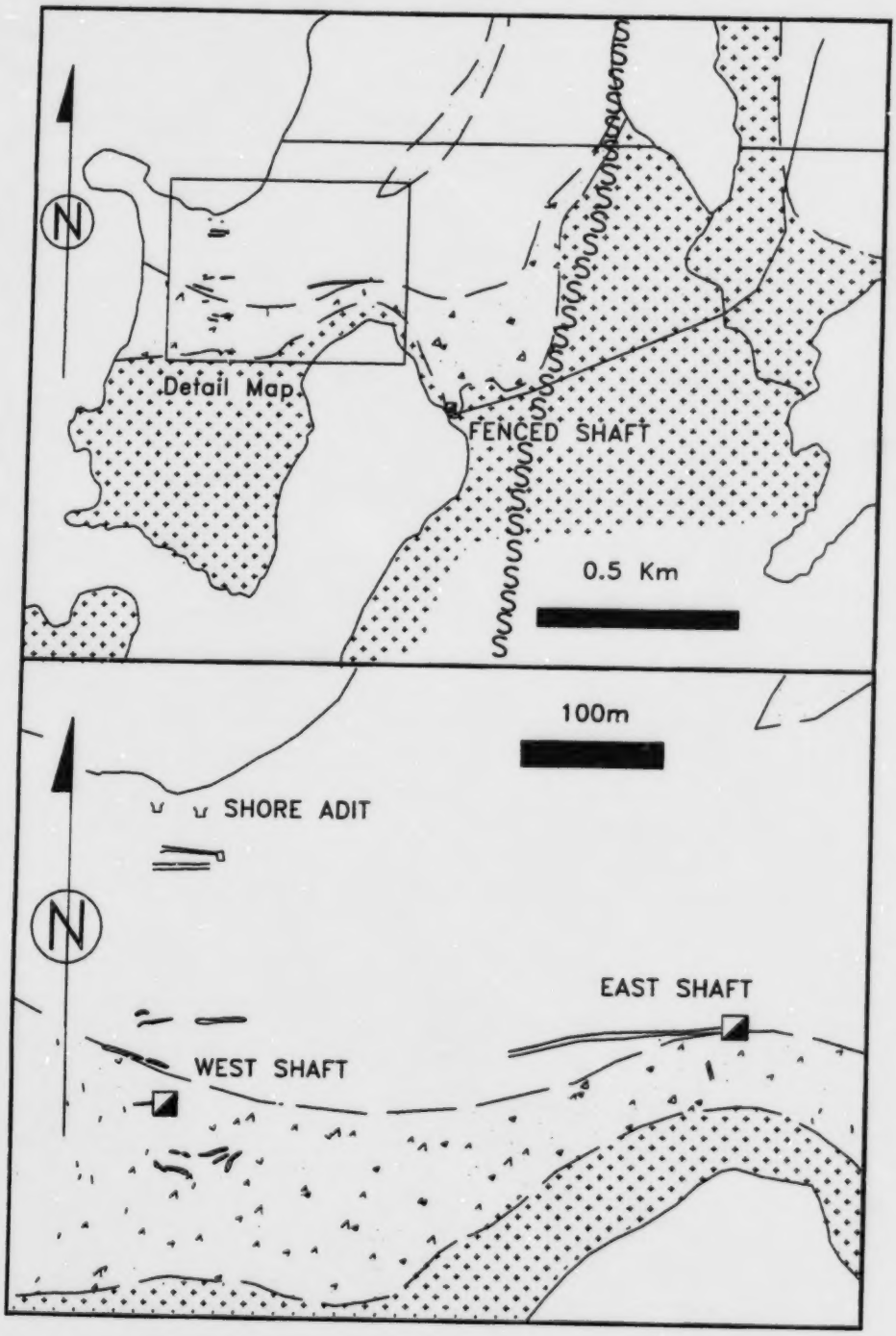
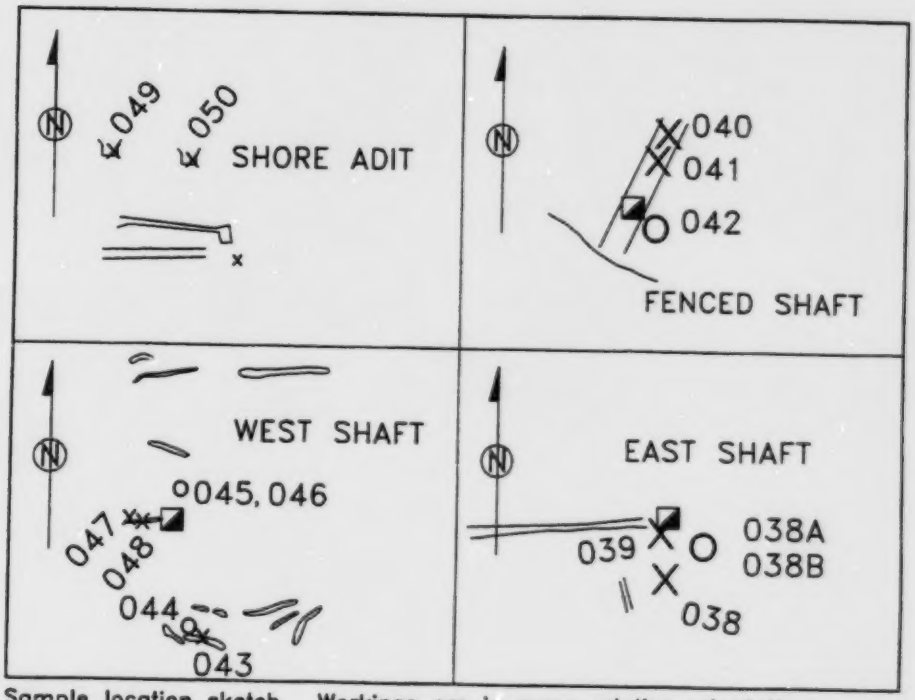
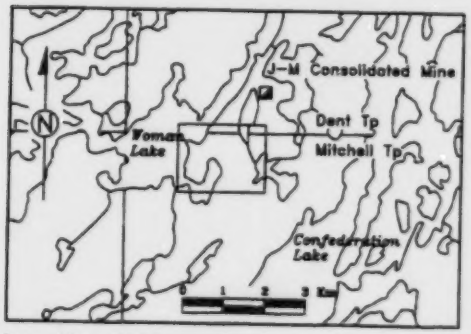


Figure 8. Jackson-Manion South geology and workings, legend and sample locations on page 25.



Sample location sketch. Workings are in same relative orientation as on the maps but are not to scale.



Location Map

LEGEND

- Mafic Intrusive Rocks
- Granitoid Rocks
- Mafic Metavolcanic Rocks
- Intermediate to Felsic Metavolcanic Rocks and Intercalated Metasediments
- Rowe Lake Shear Zone
- Shaft, Trench
- O Dump sample
- X Bedrock sample

The rocks underlying the Mitchell Township part of the property have been mapped as massive mafic flows and mafic pyroclastic breccia, greywacke and intermediate tuff and lapilli tuff by Pryslak (1970). These rocks are in contact with granitoid rocks of the Bear Lake Granodiorite (Rogers et al. 1999) which is the eastern tip of the Trout Lake Batholith. Property scale mapping by Zinn (1985) and examination of the bedrock exposures indicates the showings are hosted by mafic to intemediate metavolcanics with intercalated clastic and chemical metasediments intruded by dark grey feldspar porphyry dikes. The rock units strike east west to east-northeast. Work by Rogers et al. (1999) indicates that the rocks on the Jackson-Manion South property are part of the Woman Assemblage (2840 Ma). Gold mineralization at the J-M Consolidated Mine is associated with the Rowe Lake Shear Zone, which extends along the west side of Belljoe Lake then northeast across the mine site and under the western part of Rowe Lake. South of the mine the deformation zone is north trending and is located to the east of the workings.

The shafts and trenches of the south showings have been grouped into four arbitrary groups based on their locations. These are named the East Shaft, Fenced Shaft, West Shaft and Shore Adit. The locations are shown on Figure 8 based on the property scale map by Zinn (1985); geology is after Pryslak (1970) and Zinn (1985). All the trenches are heavily overgrown and only a few still have rock exposures in them. Sample locations are shown on the sketch (Figure 8), assay results are in Table 8.

The *East Shaft* workings consist of an approximately 10 metre deep water filled shaft and a bedrock trench, a long shallow trench extending west from the shaft no longer has bedrock exposures except at its east end. The shaft was sunk on a rusty shear zone 060°/60°N of undetermined width hosted in mafic metavolcanics intruded by grey feldspar porphyry. The metavolcanic rock exposed in the outcrop south of the shaft contains fine disseminated pyrite and pyrrhotite; a sample of this rock assayed 270.93 ppb Au. This rock shows only a weak foliation. A sample, from the dump, of black fine grained metasediment with abundant pyrrhotite and pyrite assayed 38.03 ppb Au and 705 ppm Zn.

The *Fenced Shaft* was sunk on a quartz vein hosted in altered metavolcanic rocks near the contact with the Bear Lake granodiorite. The vein strikes 025° and is exposed in the bottom of a shallow trench approximately 20 metres long and 3 metres wide. The shaft was sunk in the bottom of the trench directly on the vein. The vein is 0.5 m wide at the shaft and has a crack and seal texture. The host rock for the vein is altered intermediate to felsic metavolcanic with fine disseminated pyrite. The contact between this rock and the granodiorite is exposed in the east side of the trench. A sample from the quartz vein exposed in the trench assayed 38.25 ppb Au. This vein is close to the indicated location of the Rowe Lake Shear Zone (Rogers et al. 1999).

Workings at the *West Shaft* consist of the shaft approximately 15 metres deep and a number of largely overgrown trenches. Gold was not detected in any samples from this area although a sample of black argillitic metasediment from the shaft dump assayed 220 ppm Cu and 263 ppm Zn. A 1 metre east trending quartz vein striking was the target of the shaft. The vein is exposed in a trench that extends west from the shaft collar. Mapping by Zinn (1985) indicates iron formation and marble in this vicinity, iron formation was seen in dump material from a trench 40 m south of the shaft. Sample 2000CS043 was taken from bedrock in the bottom of this trench.

The *Shore Adit* workings consist of two cuts in a vertical outcrop (shown as adits on Zinn's map) and some shallow overgrown trenches. The westernmost 'adit' exposes a crack and seal quartz vein of undetermined width while the easternmost exposes only rusty weathering mafic metavolcanic rock. Gold was not detected in either the quartz vein or host rock sample taken at this site.

These workings expose several quartz veins of varying width and orientation, which were the likely targets of the original work. The poor exposure of the mineralized rocks limits what conclusions can be made. The veins show crack and seal textures but little or no sulphides. Fine disseminated pyrite and pyrrhotite are common in the host rock and in black argillitic metasediment seen in dump samples but not in outcrop. The mineralization exposed here has not received as much attention as that at the J-M Consolidated Mine and occurrences to the north of the mine workings. While gold assays were low to not detected in many of the samples, there is at least some gold present particularly at the East Shaft showing. A more extensive sampling program is recommended.

Table 8. Jackson Manion South assay results.

SAMPLE	Showing	Rock Type	Au 5 ppb	Ag 1 ppm	Cu 8 ppm	Pb 3 ppm	Zn 2 ppm	As 3.5 ppm
2000CS038	East Shaft	Mafic volcanic rock with sulphides	270.93	3	-	-	-	-
2000CS038A	East Shaft	Feldspar porphyry from dump	49.03	1	-	-	-	-
2000CS038B	East Shaft	Sulphide rich from dump	38.03	3	82	64	705	nd
2000CS039	East Shaft	Felsic volcanic from shaft collar	13.46	3	-	-	-	-
2000CS040	Fenced Shaft	Quartz vein	38.25	nd	-	-	-	-
2000CS041	Fenced Shaft	Felsic volcanic rock	37.81	1	-	-	-	-
2000CS042	Fenced Shaft	Quartz vein from dump	6.03	nd	-	-	-	-
2000CS043	West Shaft	Clastic metasediment	nd	3	-	-	-	-
2000CS044	West Shaft	Quartz vein from dump	nd	nd	-	-	-	-
2000CS045	West Shaft	Porphyry from dump	nd	2	-	-	-	-
2000CS046	West Shaft	Sulphide rich felsic from dump	nd	3	220	85	263	5.1
2000CS047	West Shaft	Quartz vein from trench	nd	1	-	-	-	-
2000CS048	West Shaft	Silicified felsic loose in trench	nd	3	-	-	-	-
2000CS049	Shore 'Adit'	Quartz Vein	nd	2	-	-	-	-
2000CS050	Shore 'Adit'	Sulphide rich host	nd	2	101	50	106	5.5

nd means not detected, - means not analysed for

Corless Quartz (C.C. Storey)

The Corless Quartz property is located in the Little Bear Lake & Knott Township claim map area just west of Corless Township 62 km east of Red Lake. It was discovered in 2000 by Perry English after forestry activities removed the moss cover from the main quartz outcrop. He staked a one unit claim in May 2000. Access to the property is from the Corless Road, a logging road that intersects the Joyce Lake Road 16.4 km north of the South Bay Mine road (also known as the Uchi Road).

The area is included in mapping by Thurston (1984); the adjacent Corless Township area was mapped by Pryslak (1971). There is no previous description of the occurrence. Both Thurston and Pryslak show the area to be underlain by granitoid rocks. Pryslak describes the rock as biotite granodiorite and pegmatite. Previous exploration activity in this area has been directed at gold and base metal mineralization. There is a recorded base metal occurrence in gneissic rocks at the northwest corner of the claim (*assessment files, Resident Geologist's Office, Red Lake*). The sulphide occurrence was staked and examined in 1993 by D.R. Hawke (Hawke 1993), the claims have since lapsed. Mineralization consists of stringer and disseminated pyrrhotite, chalcopyrite and pyrite. The host rock is described as felsic gneiss, mafic gneiss and amphibolite that represent highly metmorphosed volcanic rocks that form a large inclusion in the Trout Lake Batholith granitoid rocks. Four samples by Hawke (1993) returned assays of 0.11 to 1.17%

Cu and 150 to 320 ppm Zn; gold was at or below the detection limit of 5 ppb. The relationship between the quartz vein and the base metal showing if any is unknown and it is not likely that they are related. Figure 9 shows the location of the property and a sketch of the quartz exposure. The quartz occurrence consists of a large white to pink stained quartz vein of undetermined width and strike length. Two outcrops of white quartz trending 080° are exposed for a strike length of approximately 18 m. A pit has been blasted in the larger of the two outcrops. Subsequent to the writer's visit overburden stripping by the claim holder increased the exposed width to 40 metres and the strike length open. The actual vein contacts are not exposed but granodiorite host rock is exposed within 1 metre of the west end of the large outcrop and the depression between the two outcrops trends 035°. The distribution of quartz exposures implies a strike direction of 035°. The quartz is sugary textured and mostly white (>95% by visual estimate of surface area). Two subvertical joint sets 000° and 270° are present. The 000° set often shows pink hematite stain with the stain penetrating into the quartz up to 30 cm. The colour of the hematite stained quartz varies from flesh pink to rose red. Chemical analyses of the quartz in Tables 9 and 10 show little variation in silica content and little other oxides present. Gold was not detected. Iron is not present in a high enough concentration to show significant differences on the major element analysis but does appear on the trace element analyses. The pink and red stained quartz show slightly higher iron contents than the white quartz on the trace element analyses (Table 10).

Other than quartz and the sulphide showing at the west boundary of the claim only granitoid rocks are exposed on the property. The rock is grey biotite granodiorite cut by numerous narrow pink and pinkish white pegmatite dikes. The dikes are of irregular width and strike direction. These dikes were sampled as part of an ongoing examination of pegmatitic rocks. The results are in Tables 9, 10 and 11. There are at least two different sets of dikes based on their feldspar types and limited sampling. One set (the pink dikes 050A and 052) has a granitic composition while the white set (051) has a more granodiorite like composition. Element ratios in Table 12 indicate that the pegmatite dikes are not highly fractionated. Li ranges from 5 to 8 ppm, Be, Mo and Sn were not detected, Cs is less than 1 ppm. Sample 050A contains 105 ppm Cu and 478 ppm Zn.

Samples

2000CS050A	pink pegmatite	
2000CS051	white pegmatitic granitoid	
2000CS052	pink pegmatite	
2000CS053	white quartz	(271 ppm Fe)
2000CS054	red quartz	(492 ppm Fe)
2000CS055	pink quartz	(139 ppm Fe)
2000CS056	white quartz with hematite in fractures	(188 ppm Fe)
2000CS057	pink quartz with hematite in fractures	(900 ppm Fe)

Table 9. Major element analyses quartz and pegmatite samples.

Analyte	SiO_2	Al_2O_3	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	TiO_2	Fe_2O_3	LOI	TOTAL
Units	wt%	wt%	wt%	wt%	Wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%
Detection Limit	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	n/a
2000-CS-050A	73.26	14.41	0.02	0.18	1.58	3.41	4.82	0.02	0.07	1.05	0.68	99.50
2000-CS-051	73.09	15.23	0.02	0.29	3.12	4.42	0.54	0.02	0.17	1.50	0.94	99.35
2000-CS-052	74.09	14.54	0.01	0.08	1.30	4.11	3.29	0.01	0.04	0.54	0.79	98.81
2000-CS-053	96.01	2.80	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	0.14	98.95
2000-CS-054	97.02	1.91	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	0.06	0.11	99.08
2000-CS-055	97.73	1.43	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	0.10	99.22
2000-CS-056	98.36	1.60	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	0.06	0.11	100.09
2000-CS-057	97.48	0.84	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	0.06	0.13	98.47

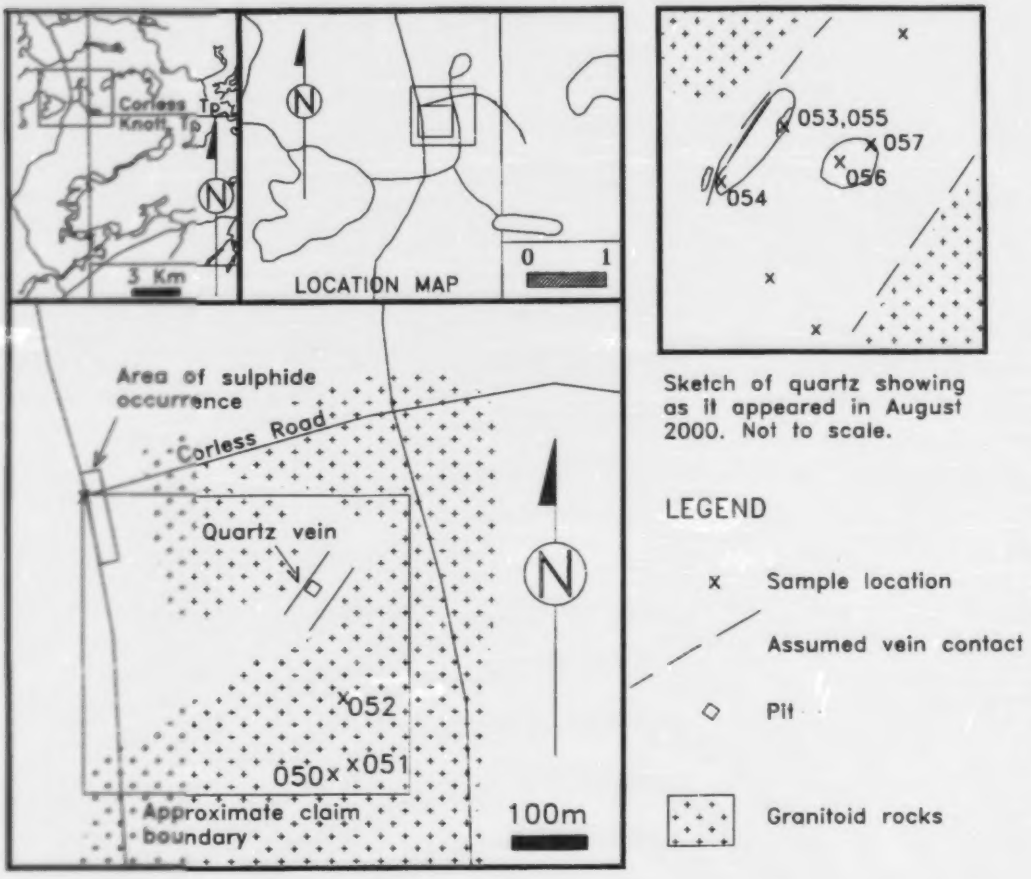


Figure 9. Corless Quartz property.

Table 10. Trace element analyses quartz and pegmatite samples.

Analyte	Al	Ba	Ca	Cu	Fe	K	Mg	Mn	Na	S	Ti	Zn
Units	ppm	ppm	ppm	ppm	Ppm	ppm	ppm	ppm	ppm	Ppm	ppm	ppm
Detection Limit	30	3	20	5	5	100	20	1	10	30	3	2
2000-CS-050A	69474	521	12210	105	8663	34724	1389	161	23912	91	416	478
2000-CS-051	67458	126	23217	10	11026	3994	1857	153	31396	81	875	24
2000-CS-052	63403	526	9512	14	4056	22534	558	68	28008	70	205	9
2000-CS-053	1346	19	91	10	271	N.D.	33	3	387	N.D.	10	2
2000-CS-054	900	9	42	N.D.	492	N.D.	23	2	305	54	9	N.D.
2000-CS-055	736	4	44	N.D.	139	N.D.	N.D.	2	493	56	10	N.D.
2000-CS-056	711	17	54	N.D.	188	N.D.	26	2	350	56	10	N.D.
2000-CS-057	569	6	39	N.D.	900	N.D.	N.D.	11	361	56	10	N.D.

Table 11. Pegmatite trace elements for pegmatite samples.

Analyte	Rb	Sr	Nb	Cs	Ta	Th	Y	Zr
Units	ppm	ppm	ppm	ppm	Ppm	ppm	ppm	ppm
Detection Limit	1	2	0.02	0.1	0.5	0.5	0.05	1
2000-CS-050A	102.66	194.6	5.99	0.973	0.69	7.26	8.45	58.21
2000-CS-051	18.07	511.1	2.00	0.796	N.D.	3.44	6.10	49.64
2000-CS-052	65.61	124.9	3.35	0.585	0.53	6.09	6.96	46.38

Table 12. Element ratios for pegmatite samples.

Sample	Na2O/K2O	Rb/Sr	K/Rb	K/Cs
2000CS050A	0.71	0.53	338.2	35687
2000CS051	8.18	0.03	221.0	5017
2000CS052	1.25	0.52	343.5	38519

Sanukitoid Reconnaissance Sampling - (A. Lichtblau)

The western Superior province hosts a chemically distinct series of plutons (sanukitoids) that range compositionally from pyroxenite through diorite, monzodiorite to quartz monzonite and granite. They occur within syn- to post-tectonic intrusive complexes and greenstone belts, and constitute 5% to 10% of the exposed crust (Stern et al., 1989). They are distinguished by 55-60% SiO_2, Mg number (Mg#) >0.60, Ni and Cr both >100 ppm, and both Sr and Ba between 600-1800 ppm (Stern et al. 1989; Stone 1998). Their chemical signature is consistent with derivation from the mantle.

Recent investigation has shown that the host rock of the palladium, platinum, gold, nickel and copper producing Lac des Iles Mine (near Thunder Bay, Ontario) is a mafic sanukitoid pluton. Greenschist-altered diorite phases of the sanukitoid Entwine Stock (in the Kenora District) host >1 ppm combined platinum, palladium and gold (Stone 2000). This new work demonstrates that sanukitoid plutons are potential sources for PGE and base metal mineralization.

Tables 13, 14 and 15 give results of reconnaissance sampling of suspected sanukitoid intrusions in the immediate Red Lake and Berens River areas (Figure 10). Analyses are consistent with those of Stone (1998), which showed that relative to the results of Stern (1989), the intrusions sampled were lower in SiO_2, Mg#, Ni and Cr. The samples from this study were from the Nungesser intrusion, lying within the Berens River terrane, 45 km north of Red Lake; the Pakwash Pluton at the English River-Uchi subprovince boundary; and the McKenzie, Hammel and Pine Ridge plutons intruding the central Red Lake greenstone belt. A normative quartz-alkali feldspar-plagioclase plot is shown in Figure 11; modal variation of the sanukitoid suite of Stone (1998) from the Berens River area is superposed, as is the average Archean sanukitoid (eleven samples from southwestern Superior Province) from Stern et al. (1989). All samples from this study fall in the quartz diorite to tonalite field and conform to the field classification ± biotite ± hornblende ± magnetite quartz diorite.

The Frame Lake pluton (120 km north of Red Lake) and the Okanse pluton (in the Confederation Lake belt, 90 km east of Red Lake) are also believed to represent late quartz diorite to monzogranite intrusions (Stone 1998). The very limited sampling done to date has not revealed PGE or base metal enrichment. Mineralization within the diorite of the Entwine Stock is associated with the greenschist alteration assemblage actinolite + chlorite + epidote + albite + calcite with a few percent sulphides (Stone 2000). Further work in 2001 will determine whether the Red Lake and Berens River sanukitoids host the requisite alteration mineralogy, and hence would be more prospective for PGE and base metal mineralization. Reconnaissance sampling will also continue to investigate other suspected sanukitoids, such as the Dome Stock and Howey diorite.

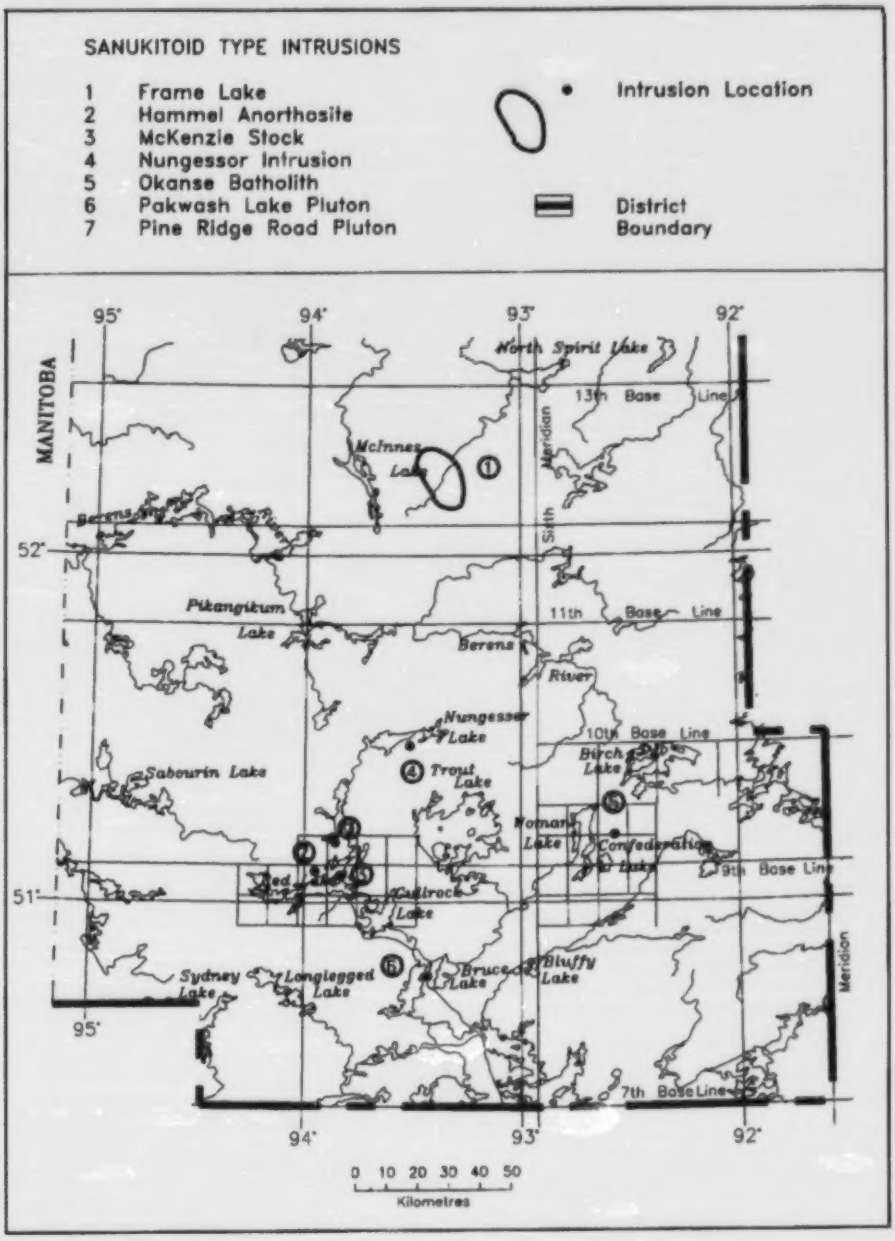
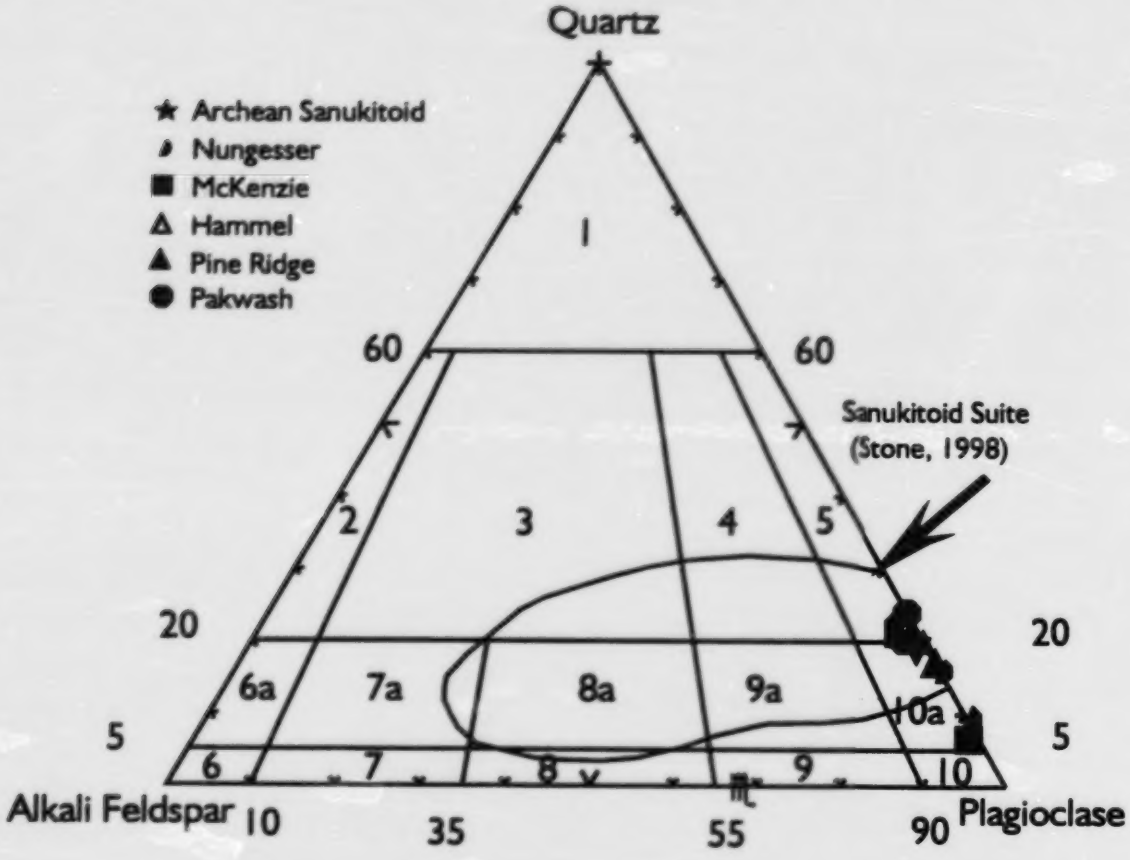


Figure 10. Locations of selected sanukitoid type intrusions.



1 Quartz-rich granitoids
2 Alkali-feldspar granite
3 Granite
4 Granodiorite
5 Tonalite
6 Alkali-feldspar granite
6a Quartz-Alkali feldspar granite
7 Syenite
7a Quartz syenite
8 Monzonite
8a Quartz monzonite
9 Monzodiorite
Monzogabbro
9a Quartz monzodiorite
Quartz monzogabbro
10 Diorite, Gabbro
Anorthosite
10a Quartz Diorite
Quartz Gabbro
Quartz Anorthosite

Figure 11. QAP plot of selected sanukitoid samples.

Table 13. Selected Red Lake sanukitoid suite major element analyses.

Sample No. Area	2000-AL-004 Nungesser	2000-AL-005 Nungesser	2000-AL-009 Pakwash	2000-AL-011 Pakwash	2000-AL-012 Pakwash	2000-AL-026 McKenzie
SiO2 %	44.68	48.73	58.61	59.00	60.06	53.28
TiO2	2.28	2.30	0.59	0.56	0.51	1.20
Al2O3	14.28	15.06	17.22	17.18	17.54	18.85
Fe2O3	11.33	10.49	6.12	6.08	5.13	7.81
K2O	1.47	1.56	2.16	2.53	2.16	1.48
MgO	5.05	5.29	4.88	4.30	3.36	3.13
MnO	0.12	0.12	0.10	0.11	0.08	0.11
CaO	10.83	8.39	5.45	5.40	5.13	7.71
FeO	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Na2O	3.03	3.27	3.67	3.67	4.31	4.09
P2O5	4.51	2.65	0.24	0.17	0.17	0.42
LOI	1.03	1.05	0.66	0.81	0.83	1.48
TOTAL	98.61	98.90	99.70	99.81	99.28	99.55

N.A. means not analyzed, N.D. means not detected.

Sample No. Area	2000-AL-027 McKenzie	2000-AL-025 Hammel	2000CS-022a Pine Ridge	2000CS-023 Pine Ridge	2000CS-025 Pine Ridge
SiO2 %	56.96	49.48	58.69	54.54	62.72
TiO2	0.69	0.88	0.43	0.52	0.39
Al2O3	17.03	17.05	20.05	13.85	19.59
Fe2O3	8.40	9.82	5.30	8.78	3.40
K2O	2.13	1.36	1.81	2.80	1.34
MgO	3.33	7.45	1.99	7.78	1.68
MnO	0.14	0.13	0.08	0.15	0.04
CaO	6.58	9.40	5.57	7.34	4.84
FeO	N.A.	N.A.	N.A.	N.A.	N.A.
Na2O	3.23	3.09	4.59	2.97	5.25
P2O5	0.27	0.31	0.16	0.33	0.14
LOI	0.84	0.51	1.03	1.11	0.80
TOTAL	99.60	99.51	99.71	100.17	100.18

Table 14. Selected Red Lake sanukitoid suite trace element analyses.

Sample No.		2000-AL-004	2000-AL-005	2000-AL-009	2000-AL-011	2000-AL-012	2000-AL-026
Area		Nungesser	Nungesser	Pakwash	Pakwash	Pakwash	McKenzie
Rb	ppm	36.80	42.32	80.80	88.72	69.16	37.15
Ba		647.88	754.75	570.12	632.05	745.23	580.40
Sr		1090.3	1031.6	757.5	639.7	973.2	845.6
Sc		11.92	13.14	19.39	13.62	9.86	13.04
La		101.948	89.247	29.366	31.533	32.739	49.328
Ce		247.734	207.939	72.498	59.497	65.081	111.337
Nd		123.38	101.41	40.16	26.28	30.44	52.35
Sm		19.135	15.742	8.380	4.324	5.550	8.265
Eu		4.121	3.323	1.711	1.250	1.390	2.257
Gd		14.382	11.616	6.761	3.459	4.103	6.549
Tb		1.738	1.375	0.952	N.D.	0.512	0.864
Yb		1.950	1.730	2.068	1.060	1.234	1.849
Lu		0.265	0.240	0.288	0.156	0.147	0.272
Y		39.08	32.12	32.83	16.42	16.62	21.17
Zr		92.35	95.16	86.08	55.78	54.46	102.90
Th		4.48	5.76	3.66	5.13	6.09	5.44
U		0.882	0.939	2.107	1.079	1.438	1.47
Hf		2.22	2.35	2.23	1.50	1.53	2.77
Nb		17.20	16.08	7.92	7.66	7.40	8.71
Ta		0.89	0.80	0.52	0.53	0.55	1.07
Cs		5.240	1.252	4.767	4.478	2.676	1.717
Dy		6.351	5.091	4.716	2.189	2.327	3.748
Er		2.571	2.144	2.374	1.191	1.072	1.949
Ho		1.150	0.924	0.910	0.468	0.452	0.780
Pr		31.777	25.849	9.731	7.193	8.141	13.826
Tm		0.319	N.D.	0.331	N.D.	N.D.	N.D.
Be		N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Cd		N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Ga		22.64	22.14	19.03	18.10	20.15	21.69
Li		29.83	27.54	34.34	44.33	30.05	21.95
Mn		786.89	751.92	732.00	756.91	589.88	665.16
Mo		1.09	1.65	N.D.	N.D.	N.D.	N.D.
Sb		N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Sn		1.58	1.55	1.65	0.98	1.16	0.90
Tl		N.D.	N.D.	0.48	0.51	0.35	N.D.
V		205.60	177.61	150.93	132.00	107.14	151.67
W		0.42	0.34	0.59	0.46	0.22	0.92
Zn		151.00	132.52	69.51	71.06	69.92	79.52
Pb		9.37	11.43	13.96	16.72	16.35	9.03
Cu		75.15	42.96	19.54	11.75	7.59	29.96
Cr		500.00	316.76	285.85	208.24	156.25	66.38
Ni		142.47	117.90	82.90	50.20	45.14	56.64
Co		34.72	19.37	22.81	19.55	16.14	22.40
Au	ppb	N.D.	N.D.	N.D.	N.D.	N.D.	5.44
Pd		N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Pt		N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Mg#		0.47	0.50	0.61	0.58	0.56	0.44

N.A. means not analyzed, N.D. means not detected.

Table 15. Selected Red Lake sanukitoid trace element analyses.

Sample No.		2000-AL-027	2000-AL-025	2000CS-022a	2000CS-023	2000CS-025
Area		McKenzie	Hammel	Pine Ridge	Pine Ridge	Pine Ridge
Rb	ppm	73.27	39.94	63.71	92.29	52.66
Ba		1033.63	550.40	696.08	814.71	604.99
Sr		691.4	1229.3	950.8	656.3	1012.3
Sc		16.29	19.66	6.77	25.29	5.04
La		24.542	49.760	12.042	20.552	16.72
Ce		52.673	105.288	25.754	38.777	33.575
Nd		24.28	51.20	9.83	18.94	14.66
Sm		4.527	7.887	1.608	3.624	2.21
Eu		1.417	2.083	0.702	1.154	0.844
Gd		3.796	5.875	1.197	3.283	1.638
Tb		0.534	0.757	N.D.	N.D.	N.D.
Yb		1.558	1.400	N.D.	1.338	N.D.
Lu		0.228	0.204	0.065	0.203	0.051
Y		16.38	19.94	6.63	18.93	5.26
Zr		110.52	107.92	95.61	91.85	89.52
Th		4.79	6.88	3.96	4.2	3.2
U		1.25	1.557	0.931	1.074	0.972
Hf		2.92	2.51	2.21	2.17	2.1
Nb		4.92	5.86	5.02	4.14	3.96
Ta		0.85	0.55	N.D.	N.D.	N.D.
Cs		6.602	2.519	6.216	5.145	3.995
Dy		2.744	3.113	0.788	2.542	0.807
Er		1.552	1.548	0.444	1.392	0.329
Ho		0.601	0.593	N.D.	0.509	N.D.
Pr		6.339	13.709	2.807	4.994	3.968
Tm		N.D.	N.D.	N.D.	N.D.	N.D.
Be		N.D.	N.D.	N.D.	N.D.	N.D.
Cd		N.D.	N.D.	N.D.	N.D.	N.D.
Ga		19.76	18.63	19.99	15.9	19.63
Li		47.96	23.00	55.13	57.86	51.38
Mn		954.68	839.24	586.05	1007.17	266.66
Mo		N.D.	N.D.	N.D.	1.46	1.32
Sb		N.D.	N.D.	N.D.	N.D.	N.D.
Sn		1.01	0.80	0.61	0.96	0.56
Tl		0.44	N.D.	0.34	0.48	0.32
V		178.17	162.47	84.65	189.36	67.39
W		0.44	0.39	0.34	0.46	0.46
Zn		91.19	88.65	99.49	84.35	57.28
Pb		11.59	10.31	11.39	9.33	12.88
Cu		84.72	52.34	15.00	67.00	21.00
Cr		20.43	232.12	30.00	344.00	13.00
Ni		16.01	189.50	25.00	76.00	20.00
Co		20.13	46.70	13.88	32.66	11.99
Au	ppb	N.D.	N.D.	1.63	4.42	2.10
Pd		N.D.	N.D.	N.D.	3.95	N.D.
Pt		N.D.	N.D.	N.D.	5.60	N.D.
Mg#		0.44	0.60	0.43	0.64	0.49

N.A. means not analyzed, N.D. means not detected.

RECOMMENDATIONS FOR EXPLORATION

Platinum, Palladium (PGE), Copper, Nickel

The relationship between PGE mineralization and mafic to ultramafic intrusive rocks is well established. There has been very little documentation of PGE mineralization in the Uchi Subprovince rocks of the Red Lake District. There are numerous mafic to ultramafic intrusive bodies identified by OGS mapping but little is known about their PGE potential. Historically these rocks were explored for copper-nickel or gold mineralization. Recent exploration work by Goldcorp Inc. in Killala and Ball townships and Rubicon Minerals Corporation in Balmer Township within the Red Lake greenstone belt and Wolfden Resources Inc. and Jonpol Explorations Ltd. in the Birch Lake-Uchi Lake greenstone belt have identified mafic intrusive rocks with significant copper, nickel, gold and PGE mineralization.

The Red Lake greenstone belt contains many mafic and ultramafic flows and intrusive rocks that have the potential to host copper-nickel-platinum group element mineralization. In particular Pipestone and Slate Bays, the Fisher Islands area and Golden Arm of Red Lake are underlain by mafic to ultramafic rock units that merit follow-up prospecting and exploration.

Sulfide mineralization associated with massive, layered and brecciated gabbros and peridotite intrusions has been reported from rocks of the Setting Net, North Spirit, Lingman, Seeber and Hornby lakes areas. Historically, platinum group element analyses appear not to have been performed on the mineralized occurrences. Most of these areas are open for staking.

The importance of the relationship between intermediate, silica undersaturated intrusive rocks (the "sanukitoid" suite of monzonites and diorites) and Cu, Ni and PGE mineralization is increasingly recognized. An example from the Kenora District highlights the current activity focussed on this newly recognized relationship: diamond drilling by Champion Bear Resources Ltd. on their Eagle Rock property intersected 1.187 g/t Pd/Pt/Au, 4.83 g/t Ag, 0.519 % Cu, 0.08% Ni in altered diorite of the Entwine Stock (*news release, Champion Bear Resources Ltd., March 23, 2000*). Several sanukitoid intrusions are known in the Red Lake District: the Frame and Stormer Lake stocks intrude the Berens River subprovince north of Red Lake. The Okanse Lake stock intrudes volcanics of the Confederation Lake belt and the McKenzie Island and Dome stocks intrude the Red Lake greenstone belt. No occurrences of Cu, Ni or PGE have yet been reported from these intrusions.

Rare-Metal Pegmatites

Recent pegmatite research carried out by the Ontario Geological Survey has lead to the discovery of rare metal pegmatite bodies at Separation Lake in the Kenora District and Pakeagama Lake in the Red Lake District. These discoveries have led to aggressive staking and exploration programs by several companies. Early results suggest the potential for commercially viable deposits of tantalum, lithium and cesium minerals in some of these pegmatites. Like other rare-metal pegmatite fields in northwestern Ontario, both the Separation Rapids and Pakeagama Lake Pegmatites lie along subprovincial boundaries. The Pakeagama Lake pegmatite is located on the Bearhead Fault that separates the Berens River and Sachigo subprovinces in the Red Lake District. Breaks, Tindle and Smith (1998, 1999) have carried out extensive research on this pegmatite. In other parts of the Bearhead Fault zone, mapping by Ayres (1970) indicated beryl southwest of Setting Net Lake and a compilation by Ayres et al. (1973) indicated lithium at two locations in the same area. Recent mapping by Stone, Crawford and Halstead (1993) and Stone, Fogal and Fitzsimon (1993) confirmed this. The entire Bearhead Fault zone warrants exploration for rare-metal pegmatites, particularly in the area between Favourable Lake and Pakeagama Lake.

Work in the Root Lake area particularly in the metavolcanic rocks north of the Lake St Joseph Fault has indicated the presence of highly fractionated pegmatites accompanied by anomalous lithium, beryllium, cesium and tantalum (Hinz et al. 2000). Recent exploration work on the former Consolidated Morrison Explorations property near Root Lake by H.W. Watts has confirmed the presence of anomalous lithium values (2.49% Li_2O and 5.91% Li_2O) (*assessment files, Red Lake Resident Geologist's Office*). The metavolcanic rocks north of the Lake St Joseph Fault in the Root Lake area therefore represent an excellent target area for rare-metal pegmatites.

Gold

Red Lake is a gold camp and gold exploration and production have long been the mainstay of the local economy. The recent Rubicon Minerals Corporation - AngloGold (Canada) Exploration Company joint venture along with the Goldcorp Inc. Red Lake Mine discoveries have shown that much of the Red Lake camp deserves continued exploration for gold using the most modern exploration theories and methods. There are many historic gold properties in the Red Lake camp that are under explored and offer excellent potential for high grade gold mineralization. The west end of the Red Lake greenstone belt, the Birch-Uchi greenstone belt and the Northern greenstone belts all have properties that deserve re-evaluation.

OGS ACTIVITIES AND RESEARCH BY OTHERS

Locations of the following projects are shown in Figures 2, 3, 4, 5 and 6.

Five projects were undertaken by the Ontario Geological Survey in the Red Lake District in 2000. Four of these projects were an collaboration with the Geological Survey of Canada (GSC), as an integral part of the Western Superior NATMAP (National Mapping Program).

A) P.J. Barnett, Sedimentary Geoscience Section, in a collaboration with V.H. Singhroy of the Canada Centre for Remote Sensing, Natural Resources Canada completed the first year of a two year study to create terrain maps. The terrain maps will be created using the integration and interpretation of various types of remotely sensed imagery, digital elevation models, their derivatives and geological depositional models. Six (6) pilot areas are bounded by Latitudes 51° and 54°N and Longitude 87°W and the Manitoba border. The two of the six pilot areas studied this year are bounded by Latitudes 51° and 52°N and Longitudes 93°W and 94°W (Barnett and Singhroy 2000).

These four studies were part of the Western Superior NATMAP program:

B) F.W. Breaks, Precambrian Geoscience Section, in a continuing collaboration with S.R. Smith , S.P. Kelley, and A.G. Tindle, of The Open University, Milton Keynes, UK, and R.L. Romer of GeoForschungsZentrum Potsdam, D-14473 Potsdam, Germany, completed the third year of field and laboratory investigations, which included combined U-Pb Columbite and $^{40}Ar/^{39}Ar$ mica ages from Rare-Element Pegmatites, on the Pakeagama Lake and Separation Lake Pegmatites. The Pakeagama Lake Pegmatite is a highly-evolved, complex-type, petalite-subtype rare-element mineralization in the Berens River-Sachigo Subprovince Boundary Zone. Pakeagama Lake is located approximately 200 km north of Red Lake (Smith et al. 2000).

C) J. Parker, Precambrian Geoscience Section, completed the first year of a multi-year project, to study gold mineralization and related hydrothermal alteration at a regional scale in the Red Lake greenstone belt, by focusing on supracrustal rocks in the eastern and middle portions of the greenstone belt. Fieldwork in the Red Lake greenstone belt was completed on the following areas: identify new gold

exploration targets, and to constrain the timing of gold mineralization and hydrothermal alteration relative to deformation and metamorphism (Parker 2000a).

D) J. Parker, Precambrian Geoscience Section, completed the third year of a multi-year study of the regional metallogeny of the Northwestern Superior Province, with emphasis on the distribution of nickel-copper-platinum group element sulphide mineralization. Fieldwork in the Red Lake greenstone belt and surrounding areas was completed on the following areas: reconnaissance sampling and mapping of mafic and ultramafic intrusive rocks (Parker 2000b).

E) D. Stone, Precambrian Geoscience Section, completed a multi-year 1:50 000 scale regional mapping survey in the northern Superior Province, which was started in 1995, in the Blackbear, Yelling and Stull Lake areas, approximately 350 km north of Red Lake. Fieldwork was completed in the following three areas: (1) Blackbear Lake area regional mapping and sampling; (2) Yelling Lake area reexamination to resolve the geology and positions of regional faults in poorly exposed areas near the Manitoba-Ontario border; and (3) Stull Lake reexamination of geology and mineral potential of the map area (Stone and Halle 2000).

Other NATMAP program studies supporting the LITHOPROBE (Western Superior Transect) project were completed in the Red Lake District and included the following:

F) Lithoprobe (Western Superior Transect) project completed a regional seismic reflection survey in the Red Lake District. The Lithoprobe line ran north of Red Lake from the end of the Nungesser Road onto Highway 125, and down Highway 105 to south of Perrault Falls (Percival et al. 2000).

G) J. Mareschal (University of Quebec) and C. Jaupart (Institute du Physique du Globe de Paris) completed a heat flow measurements study, which uses existing exploration drill holes and drill core samples, for the western part of the Superior Province in the Canadian Shield. The location of the exploration drill holes used for the study were located near the towns of Balmertown (Dome Township) and Red Lake (Heyson Township), the Ben Lake property (Gerry Lake area), and the Garnet Lake property (Belanger Township) (J. Mareschal, GEOTOP, written communication, 2000).

H) V. McNicoll (GSC) completed geochronology study in the Confederation-Birch-Uchi greenstone belt, in an attempt to constrain whether the *ca.* 2.84 Ga Woman assemblage is present at its type locality (Percival et al. 2000).

I) D.A. Panagapko, L. Valade, J.R. Harris, and N. Brown (GSC) completed and released a CD on the Preliminary Release of Geoscience Data for the Red Lake Greenstone Belt, Northwestern Ontario, Canada, using an Application of GIS and Remote Sensing Technologies. The CD was released by the OGS as a Miscellaneous Release -- Data 62 and by the GSC as an Open File D3751 (Percival et al. 2000).

J) M. Sanborn-Barrie and T. Skulski, (GSC) completed a two year study in the Red Lake greenstone belt, which focussed on the 300 million years of tectonic history recorded by the Red Lake greenstone belt (Percival et al. 2000).

Two university theses studies were also completed:

K) L. Bowes-Lyon of McGill University, completed petrography and geochemistry studies on the Red Lake greenstone belt komatiites and komatiitic basalts, in the Uchi subprovince under the supervision of Andrew Hynes (*M. Sanborn-Barrie, GSC, written communication, 2000*).

L) A. Zagroevski of the University of Ottawa, completed structural and metamorphic evolution studies on the Trout Bay Assemblage, on the west end of the Red Lake greenstone belt under the supervision of Keiko Hattori (*M. Sanborn-Barrie, GSC, written communication, 2000*).

Table 16. Publications received by the Red Lake Office in 2000.

Title	Author	Type and Year of Publication
Electron Microprobe Analyses and Sample Descriptions of Tantalum-Bearing Oxide Minerals from Rare-Element Granitic Pegmatites of the Separation Rapids Pegmatite Group, Northwestern Ontario	A.G. Tindle and F.W. Breaks	OGS, Miscellaneous Release – Data 59, 2000
Preliminary Release of Geoscience Data: Red Lake Greenstone Belt, Northwestern Ontario	D.A. Panagapko, L. Valade, J.R. Harris, and N. Brown	OGS, Miscellaneous Release – Data 62, 2000
Precambrian Geology, Sherman River Area	D. Stone, J. Halle, J. and Lange, M.	OGS, Preliminary Map, P.3418, 2000
Precambrian Geology, Withers Lake Area	D. Stone, J. Halle, J. and Lange, M.	OGS, Preliminary Map, P.3419, 2000
Geological Setting of Mineralization in the Mine Centre – Fort Frances Area	K.H. Poulsen	OGS, Mineral Deposits Circular 29, 2000
Precambrian Geology and Mineral Occurrences	K.H. Poulsen	OGS, Map 2525, 2000
Archean Metallogency of the Mine Centre – Fort Frances Area	K.H. Poulsen	OGS, Geological Report 266, 2000
The Mafic-Ultramafic Intrusions of the Atikokan-Quetico Area, Northwestern Ontario	A.D. MacTavish	OGS, Open File Report 5997, 1999
Precambrian Geology of the Separation Lake Area, Northwestern Ontario	C.E. Blackburn and J.B. Young	OGS, Open File Report 6001, 2000
Precambrian Geology, Separation Lake, Greenstone Belt, West Part	C.E. Blackburn, J.B. Young, T.O. Searcy, and K. Donohue	OGS, Open File Map 241, 1994
Precambrian Geology, Separation Lake, Greenstone Belt, East Part	C.E. Blackburn, J.B. Young, T.O. Searcy, and K. Donohue	OGS, Open File Map 242, 1994
Report of Activities, 1999, Resident Geologist Program, Red Lake Regional Resident Geologist Report: Red Lake and Kenora Districts	P. Hinz, C.C. Storey, S.DM. Gosselin, C.C. Blackburn and L. Kosloski	OGS, Open File Report 6003, 2000
Report of Activities, 1999, Resident Geologist Program, Thunder Bay North Regional Resident Geologist Report: Thunder Bay North and Sioux Lookout Districts	J.K. Mason, D. Farrow, G. Seim, G.D. White, M.S. O'Brien, A. Walden and C. Komar	OGS, Open File Report 6004, 2000
Report of Activities, 1999, Resident Geologist Program, Timmins Regional Resident Geologist Report: Timmins and Sault Ste. Marie Districts	B.R. Schnieders, J.F. Scott, M.C. Smyk and M.S. O'Brien	OGS, Open File Report 6005, 2000

Title	Author	Type and Year of Publication
Report of Activities, 1999, Resident Geologist Program, Thunder Bay South Regional Resident Geologist Report: Thunder Bay South District	B.T. Atkinson, M.H. Hailstone, C.B. Ravnaas, A.C. Wilson, D.M. Draper, P. Hope, P.M. Morra and S.A. Beauchamp	OGS, Open File Report 6006, 2000
Report of Activities, 1999, Resident Geologist Program, Kirkland Lake Regional Resident Geologist Report: Kirkland Lake and Sudbury Districts	G. Meyer, M. Cosec, G.P.B. Grabowski, D.L. Guindon, E.C. Chaloux and M. Charette	OGS, Open File Report 6007, 2000
Report of Activities, 1999, Resident Geologist Program, Southern Ontario Regional Resident Geologist Report: Southeastern and Southwestern Districts, Mines and Minerals Information Centre, and Petroleum Resources Centre	P.J. Sangster, W.J. McGuinty, V.C. Papertzian, K.G. Steele, C.R. Lee, D.A. Laidlaw and T.R. Carter	OGS, Open File Report 6008, 2000
The Distribution of Gold Grains in Till, Sachigo River Mine, Northwest Ontario	D. Stone, J. Halle and M. Lange	OGS, Open File Report 6015, 2000
Geology, Mineral Chemistry and Thermobarometry of the Entwine Stock, Northwest Ontario: Base Metal, Platinum Group Element and Gold Mineralization	D. Stone	OGS, Open File Report 6021, 2000
Tantalum Mineralogy of Rare-Element Granitic Pegmatites from the Separation Lake Area, Northwestern Ontario	A.G. Tindle and F.W. Breaks	OGS, Open File Report 6022, 2000
Garden-Obonga Lake Area Lake Sediment Survey: Gold and PGE Data	Ontario Geological Survey	OGS, Open File Report 6028, 2000
Mines and Wines: Industrial Minerals, Geology and Wineries of the Niagara Region – Field Trip Guidebook	K.G. Steele and S.J. Haynes	OGS, Open File Report 6029, 2000
Summary of Field Work and Other Activities 2000	Edited by J.A. Ayer, C.L. Baker, R.I. Kelly, J.R. Parker, G.M. Stott and P.C. Thurston	OGS, Open File Report 6032, 2000
Bedrock Geology of the Province of Ontario; Seamless Coverage	Ontario Geological Survey	OGS, ERLIS Data Set 6, 1993
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Geology of the Kistigan Lake Area (NTS 53K/10 and part of 53K/9)	M.T. Corkery, T. Skulski, J.B. Whalen, and D. Stone	Manitoba Energy and Mines, Preliminary Map 2000S-1, 2000
Geology of the Little Stull Lake Area (NTS 53K/7 and part of 53K/8)	D. Stone , J. Halle, and M.T. Corkery	Manitoba Energy and Mines, Preliminary Map 2000S-2, 2000
Explore in Manitoba – Report of Activities 2000	Staff of the Manitoba Geological Survey	Manitoba Energy and Mines, Report of Activities, 2000
Recent advances in the geology and structure of the Confederation Lake region, northwestern Ontario	N. Rogers, C.R. van Staal, and V. McNicoll	GSC, Current Research 1999-C, 1999
A preliminary report on amphibolite-facies, disseminated-replacement-style mineralization at the Madsen gold mine, Red Lake, Ontario	B. Dube, W. Balmer, M. Sanborne-Barrie, T. Skulski, and J. Parker	GSC, Current Research 2000-C17, 2000
Integrated regional analysis of the Red Lake greenstone belt and its mineral deposits, western Superior Province, Ontario	M. Sanborn-Barrie, T. Skulski, J. Parker, and B. Dube	GSC, Current Research 2000-C18, 2000
Geological Classification of Canadian Gold Deposits	K.H. Poulsen, F. Robert, and B. Dube	GSC, Bulletin 540, 2000
World distribution of porphyry, porphyry-associated skarn, and bulk-tonnage epithermal deposits and occurrences	Compiled by: R.V. Kirkham and K.P.E. Dunne	GSC, Open File 3792a, 2000
World distribution of porphyry, porphyry-associated skarn, and bulk-tonnage epithermal deposits and occurrences	Compiled by: R.V. Kirkham and K.P.E. Dunne	GSC, Open File 3792b, scale 1:35 000 000, 2000
Western Superior Lithoprobe 1998 Annual Meeting Progress Reports, Technical Communications, and Abstracts	R.M. Harrap, H.H. Helmstaedt, eds.	Western Superior Lithoprobe Transect Fourth Workshop, March 23-24, 1998. Lithoprobe Report #65, Lithoprobe Secretariat, University of British Columbia
Lithoprobe Western Superior Transect Fifth Annual Workshop, February 1-3, 1999, Lithoprobe Report #70	R.M. Harrap, H.H. Helmstaedt, eds.	1999 Western Superior Transect Fifth Annual Workshop, Lithoprobe Secretariat, University of British Columbia
Natural Stone in Canada – A History of Quality	O. Vagt, G. Simandl, D.F. Gunning, A. Howse, J. Bamburak, T. Webb, P. Finck, M.C. Gerow, J. Beaulieu, Y. Bellemare, L. Kelley, J. Dumontier, P.E. Robitaille, R. Vallee, and P. Chenier	Roc Maquina, December 1999
Platinum-Palladium Group Minerals, Gold, Silver, and Cobalt in the Minnamax Copper-Nickel Sulfide Deposit, Duluth Complex, Northeastern Minnesota	P.L. McSwiggen	Report of Investigations 54, Minnesota Geological Survey, 1999

Title	Author	Type and Year of Publication
Geochemical Evaluation of Platinum Group Element (PGE) Mineralization in the Sonju Lake Intrusion, Finland, Minnesota	J.D. Miller	Information Circular 44, Minnesota Geological Survey, 1999
Lode Gold and Massive Sulfide Prospects in the Archean Western Vermilion District of Northeastern Minnesota	D.L. Southwick, D.M. Peterson, and M.A. Jirsa	Minnesota Exploration Conference Proceedings, 1999
Dynamic processes in magmatic ore deposits and their application to mineral exploration	Edited by R.R. Keays, C.M. Lesher, P.C. Lightfoot, and C.E.G. Farrow	GAC, Short Course Notes Volume 13, 1999
Provincial Geologists Journal	The Committee of Provincial Geologists	Volume 17, 1999
Economic renewal forum on the potential for partnerships: Mining companies and the aboriginal community		Economic Renewal Secretariat, 2000
Platinum-Group Elements: Mineralogy, Geology, Recovery	Edited by L.J. Cabri	The Canadian Institute of Mining and Metallurgy, CIM Special Volume 23, 1989
The Relationship of Lamprophyres to Gold Deposits, Particularly Those of Precambrian Age	M.W. Bartley	Unpublished M.A. thesis, University of Toronto, 1937
Metamorphism in the Eastern Lac Seul Region of the English River Subprovince, Ontario	S.J. Chipera	Unpublished M.Sc. thesis, University of North Dakota, 1985
The Platinum Group Element and gold Content of Some Nickel Sulphide Ores	E.L. Hoffman	Unpublished PhD thesis, University of Toronto, 1978
Geochemistry of the Uchi Subprovince, Northern Superior Province: An evaluation of the geodynamic evolution of the northern margin of the Superior Province ocean basin	P.N. Hollings	Unpublished PhD thesis, University of Saskatchewan, 1998
A Geochemical Study of Four Precambrian Granites in Northwestern Ontario	J.D. Vollrath	Unpublished PhD thesis, Carleton University, 1964

Table 17. Mineral deposits not being mined in the Red Lake District in 2000.

Abbreviations

AF ..... Assessment Files	MLS ..... Mining Lands, Sudbury
CMH ..... Canadian Mines Handbook	MR ..... Mining Recorder
GR ..... Geological Report	NM ..... The Northern Miner
MDC ..... Mineral Deposit Circular	OFR ..... Open File Report
MDIR ..... Mineral Deposit Inventory record	PC ..... Personal Communication

Deposit Name/ NTS	Commodity	Tonnage-Grade Estimates and/or Dimensions	Ownership References	Reserve References	Status
Abino Bateman, Balmer and Deme Townships (52N/04SW)	Au	Total Granodiorite Zone drill indicated tonnage 405 162 tons 0.203 opt Au from three sub-zones (McClean 1976)	Goldcorp Inc.	AF	Patent
Aiken-Russet Baird Township (52K/13NW)	Au	Total reserves of 102 555 tons of 0.22 opt Au	Claude Resources Inc.	AF	Patent
Alcourt (Copper Man, Hansen-Campbell) Fairlie Township (52N/04SW)	Au	Reserves: 20 000 tons of 0.45 opt Au (Tilsley 1981) from 1959-60 diamond drilling No. 1 vein - 17 000 tonnes 0.2429 oz per tonne Au (Tilsley 1981) from 1959-60 diamond drilling and 1981 sampling program	Unknown	AF	Patent
Amco Mine Deme Township (52N/04SW)	Au	Reserves: 50 000 tons "Excellent Grade" (0.35 opt Au?)	Goldcorp Inc.	OFR Energy Mines and Resources Canada 1989	Patent
Bathurst Mine Skinner Township (52N/07SW)	Au	Reserves: 80 000 tons of 0.587 opt Au	Sabina Resources Ltd.	Energy Mines and Resources Canada 1989	Leased
Berens River Mine (Golnil, Zahavy) (53C/13SE)	Au, Ag, Pb, Zn	Reserves: No. 1 Zone - 75 000 tons 0.1 - 0.2 opt Au, 4.0 – 5.0 opt Ag No. 3 Zone - 982 213 tons 0.26 opt Au, 4.8 opt Ag, 0.77% Pb, 1.12% Zn (713 249 tons indicated, 268 964 tons inferred) at 0.15 opt Au cut-off to 750 metre level	Wolfden Resources Inc.	MDIR AF - (Bevan, 1983)	Leased

Deposit Name/ NTS	Commodity	Tonnage-Grade Estimates and/or Dimensions	Ownership References	Reserve References	Status
Bluffy Lake (52K/14SE)	Fe	Reserves: 21 000 000 tons at 22.86% Fe	Unknown	Prelim. Map P.1199	Licence of Occupation
Borland Lake (53D/16NE)	Ag, Au	Probable Reserves: 502 412 tons of 8.09 opt Ag and 0.02 opt Au	Unknown	Massive Resources Ltd. Preliminary Prospectus - August 6, 1987	Leased
Buffalo Red Lake Heyson Township (52N/04SW)	Au	Reserves: 421 728 tonnes of 0.139 opt Au drill indicated in 1980	Claude Resources Inc.	MDIR	Patent
Cochenour Willans Mine Dome Township (52N/04SW)	Au	Reserves: Proven and probable 173 000 tons of 0.51 opt Au, possible reserves 274 000 tons of 0.59 opt Au	Goldcorp Inc.	NM - Dec. 12, 1994 p.7	Patent Licence of Occupation
Cole Gold Mine Ball Township (52M/01SE)	Au	Reserves: 119 780 tons of 0.41 opt Au probable and indicated (Wilton, 1973)	The Cole Gold Mines Ltd.	AF	Patent Licence of Occupation
Consolidated Marcus Dome Township (52N/04SW)	Au	Reserves: 60 000 tons of 0.18 opt Au	Goldcorp Inc.	Energy Mines and Resources Canada 1989	Patent
Copper Lode A – Rexdale Group Prospect (52K/15NW)	Cu, Ag	Reserves: 236 424 tons of 1.94% Cu, 1.22 opt Ag or 425 612 tons of 1.56% Cu, 0.98 opt Ag or 854 007 tons of 1.01% Cu, 0.57 opt Ag	P. English	AF MP152	Staked Claim
Copper-Lode D Belanger Township (52K/15NW)	Cu, Zn	Reserves: 36 000 tons of 0.26% Cu, 7.58% Zn	Noranda Mining and Exploration Inc.	AF	Leased
Copper-Lode E Belanger Township (52K/15NW)	Cu, Ag	Reserves: 160 000 tons 8.28% Zn, 1.02% Cu, 0.39 opt Ag	Noranda Mining and Exploration Inc.	AF	Leased
Dixie Creek (52K/13SE)	Au	Reserves: 417 000 tons of 0.126 opt Au	Perry English	AF	Staked Claim
Dixie 3 Prospect (52K/14NW)	Cu, Zn	Reserves: 91 000 tons of 10.0% Zn, 1.0% Cu	Noranda Mining and Exploration Inc.	AF	Leased - Mining Rights Only Staked Claim

Deposit Name/ NTS	Commodity	Tonnage-Grade Estimates and/or Dimensions	Ownership References	Reserve References	Status
Dixie 18 Prospect (52K/14NW)	Zn	Reserves: 110 000 tons of 0.5% Cu, 12.5% Zn	Norønda Mining and Exploration Inc.	AF	Staked Claim
Grassett Prospect Earngey Township (52N/02SE)	Au	Reserves: 78 295 tons of 0.22 opt Au (Part of the Hill-Sloan-Tivy Vein)	Lac Properties Inc.	Energy Mines and Resources Canada 1989	Patent
Griffith Mine (52K/14SW)	Fe	Reserves: 120 000 000 tons of 29% Fe	Unknown	GR82	Patent
Hasaga Mine Heyson Township (52N/04SW)	Au	Reserves: C Block (below 1800 feet) 200 203 tons of 0.192 opt Au Stopes - 41 430 tons of 0.104 opt Au Pillars - 6 365 tons of 0.134 opt Au	Lac Properties Inc.	GR56	Patent
Hill-Sloan-Tivy Earngey Township (52N/02SE)	Au	Reserves: 296 000 tons of 0.219 opt Au (Grassett Prospect Reserves may be included in total)	Unknown	AF	Patent
Horseshoe Island (52N/08NW)	Au	Reserves: 893 508 tons of 0.14 opt Au	John Pollock	Northwest Prospector, March/April 1990, p.27	Staked Claim
Howey Mine Heyson Township (52N/04SW)	Au	Reserves: 780 000 tons of 0.08 opt Au	Teck Corporation	Energy Mines and Resources Canada 1989	Patent Licence of Occupation
Jackson-Manion Mine Dent Township (52N/02SE)	Au	Reserves: 40 000 tons of 0.5 opt Au	Orofino Explorations Ltd.	NM - March 14, 1985, p.21	Patent
Joy - New Zone (Diamond Willow Zone, Creek Zone) (52K/14NW)	Cu, Zn	Reserves: 300 000 tons of 4% combined Cu-Zn	Noranda Mining and Exploration Inc.	AF	Staked Claim
Kesaka Lake (52K/16NW)	Fe	Reserves: 312 500 000 tons of 31.1% Fe to a depth of 100 feet	Unknown	ODM Annual report Vol. 48, pt. 8, p. 1-43	Leased
Laverty (Thrall) Heyson Township (52N/04SW)	Au	Reserves: Speculative reserves from the Diabase dike zone: 329 000 tons of 0.08 opt Au or 75 000 tons of 0.15 opt Au	Unknown	AF	Patent

Deposit Name/ NTS	Commodity	Tonnage-Grade Estimates and/or Dimensions	Ownership References	Reserve References	Status
Lingman Lake (53F/15SW)	Au	Reserves: 1 172 753 tons of 0.20 opt Au in all zones at 5.0 foot minimum width and a cut-off grade of 0.08 opt Au (McPhee, 1989)	Cool Minerals Inc.	AF	Patent
May-Spiers Ball Township (52M/01SE)	Au	Reserves: 30 000 tons of 0.09 opt Au	Goldcorp Inc.	AF	Staked Claim
McCombe (Root Lake) (52J/13NE)	Lithia	Reserves: 2.3 million tons of 1.3% Lithia to the 500 foot level	Unknown	MP90	Patent Licence of Occupation
McFinley Mine Bateman Township (52N/04SE)	Au	Preliminary Reserves: 890 000 tons of 0.21 opt Au	McFinley Red Lake Mines Ltd.	CMH	Patent Licence of Occupation
Mount Jamie Todd Township (52M/01SE)	Au	Reserves: Main Zone - 47 048 tons of 0.425 opt Au No. 2 Shaft area - 25 360 tons of 0.37 opt Au	Claude Resources Inc.	AF	Patent
My-Ritt (Coin Lake) Heyson Township (52N/04SW)	Au	Unknown	My-Ritt Red Lake Gold Mines Ltd.	OFR 5551	Patent
New Faulkenham Mines Ltd. (Faulkenham Lake) Baird Township (52K/13NW)	Au	Reserves: 15 000 tons of 0.428 opt Au ($15.00 at $35.00 per ounce Au - Holbrooke, 1958)	Claude Resources Inc.	AF	Patent
North Spirit Lake (Crown Trust) (53C/07NW)	Fe	Reserves: 1.3 million tons per vertical foot of 33.94% Fe	Unknown	ODM Annual Report Vol.47, Pt. 7, p.44-78 GR150	Patent
Northgate Prospect Earngey Township (52N/02SE)	Au	Reserves: 64 600 tons of 0.28 opt Au	Perry English/ John Green	AF	Staked Claim
Ogani Lake (52K/15NE)	Fe	Reserves: 100 000 000 tons of 21.6% Fe	Crown	AF	Open
Papaonga Lake (52K/16NE)	Fe	Reserves: 13 500 000 tons of 31.06% Fe	Crown	MDIR	Open

Deposit Name/ NTS	Commodity	Tonnage-Grade Estimates and/or Dimensions	Ownership References	Reserve References	Status
Red Crest (Red Summit) Todd Township (52M/01SE)	Au	Reserves: 47 439 tons of 0.269 opt Au (uncut grade) - Horwood, 1945 38 000 of 0.3 opt Au	Claude Resources Inc.	NM - March 14, 1985,p.21 DoM Annual Report vol. 49, pt. 2, 1940	Patent
Redaurum Baird Township (52N/04SW)	Au	Possible Reserves: 14A Zone - 243 750 tons 0.22 opt Au 26 250 tons 0.20 opt Au No. 2 Zone - 137 500 tons of 0.18 opt Au No. 3 Zone - 102 500 tons of 0.18 opt Au Camp Zone - 24 750 tons of 0.13 pt Au	Sabina Resources Ltd. (80%) and Redaurum Ltd. (20%)	AF	Patent
Richardson (Kostynuk Bros. Mine) (52N/09SW)	Au	Reserves: 700 000 tons of 0.2 opt Au inferred reserves	Unknown	OFR 5835	Patent
Rowan Todd Township (52M/01SE)	Au	Reserves: 10 900 tons of 0.657 opt Au ($23.00 a ton at $35.00 per ounce)	Goldcorp Inc.	AF	Patent
Sanshaw (Whitehorse Island) Dome Township (52N/04SW)	Au	Reserves: 175 000 tons of 0.20 opt Au	Bonanza Red Lake Explorations Inc.	NM - June 11, 1953	Patent Licence of Occupation
Setting Net Lake (53C/13SE)	MoS_2	Reserves: 100 000 000 tons of 0.09% MoS2	Crown	MDIR NM - March 23, 1973	Open
Sol-D'Or Honeywell Township (52N/07SE)	Au	Reserves: 8 565 tons of 0.57 opt Au	Crown	Energy Mines and Resources Canada 1989	Unknown
Springpole Lake Prospect (52N/08NW)	Au	Reserves: Portage Zone - 7.9 million tons of 0.07 opt Au 27 million tons of 0.035 opt Au including 4 million tons of 0.091 opt Au and 405 000 tons of 0.14 opt Au	Gold Canyon Resources Inc.	OFR 5835	Patent Staked Claims
Starratt-Olsen Mine Baird Township (52K/13NW)	Au	Reserves: 15 000 of 0.45 opt Au	Claude Resources Inc.	NM - July 26, 1973 MDIR	Patent

Deposit Name/ NTS	Commodity	Tonnage-Grade Estimates and/or Dimensions	Ownership References	Reserve References	Status
Trout Bay Zinc Pit Zone Mulcahy Township (52M/01SE)	Zn, Cu, Pb, Ag, Au	Reserves: West Zone - 13 776 tons of 4.75% Zn, 0.68% Cu, 0.94 opt Ag East Zone - 124 760 tons 7.86% Zn, 1.5% Cu, 0.24% Pb, 1.7 opt Ag, 0.007 opt Au	Goldcorp Inc.	MP147 Prelimary Map P.567 MDIR	Patent (Mining Rights Only), Leased (Mining Rights Only, Licence of Occupation
Uchi Mine Earngey Township (52N/02SE)	Au	Reserves: 214 000 tons of 0.147 opt Au	Lac Properties Inc.	Energy Mines and Resources Canada 1989	Patent
Wilmar Mine Dome Township (52N/04SW)	Au	Reserves: Quoted from Durocher et al 1987 unless indicated otherwise Diorite Dike Zone - 140 000 tone of 0.21 opt Au East Breccia Zone - 31 500 tons of 0.32 opt Au (Proven) - 50 500 tons of 0.25 opt Au (Probable) - 1 777 000 tons of 0.24 opt Au (Possible) Carbonate Zone - 25 000 tons of 0.17 opt Au (Probable) - 7 500 tons of 0.15 opt Au (Possible) West Granodiorite Zone - 3.15 to 4.5 million tons of 0.076 to 0.131 opt Au (EMR Canada, 1989) Granodiorite Zone - 5 700 000 tons of 0.10 to 0.15 opt Au	Goldcorp Inc.	OFR 5558 Energy Mines and Resources Canada 1989	Patent
Woco Vein Earngey Township (52N/02SE)	Au	Reserves: 21 263 tons of 0.80 opt Au	St. Jude Resources Ltd.	AF	Staked Claims
Young, H.G. Mines Ltd. Balmer Township (52N/04SW)	Au	Reserves: 270 000 tons of 0.31 opt Au	Placer Dome North America	OFR 5558	Patent

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Ontario

Ontario Geological Survey
Regional Resident Geologist Program

Red Lake Regional Resident Geologist (Kenora District)--2000

by

C. Ravnaas and A. Raoul

2001

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Kenora District -- 2000

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RED LAKE-KENORA REGIONAL RESIDENT GEOLOGIST (KENORA DISTRICT)–2000

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INTRODUCTION

Dimension, monument and decorative stone continued to be produced and marketed from six quarries in the Kenora District in 2000. No metallic mineral production was recorded in the District. A total of 45 companies and prospectors are known to have conducted mineral exploration and prospecting programs in the District during 2000. Advanced market analysis projects at Separation Rapids rare metal projects (Avalon Ventures Ltd. and Emerald Fields Resource Corp.) were conducted in 2000. There were no advanced exploration projects in the Kenora district in 2000 but several exploration projects were the result of previous years work. Precious metals received 17 exploration projects but a majority of the projects were in conjunction with platinum group elements and base metal projects. Platinum group elements were the primary mineral target with 18 exploration projects. Three of the 20 base metals projects were not in conjunction with other elements. Rare metals received 6, and stone received 5 exploration projects. A new mineral commodity becoming a target of mineral exploration in the Kenora District is diamonds.

MINING ACTIVITY

Production continued from five granite quarries including one new quarry, and one soapstone quarry. The quarries are keyed, with letters in parentheses, to Figure 1.

Dimension and Monument Stone

Nelson Granite Ltd. (a division of Granite Monuments Ltd.)

Nelson Granite Ltd. continued year-round production from four stone quarries and started production on a fifth, in the Kenora District, during 2000. Production continued at the Docker Township quarry (A), 10 km southwest of the Town of Vermilion Bay. Approximately 7 080 m^3 (250 000 ft^3) of "Vermilion Pink" stone were produced for use in the monument industry (N. Nelson, Nelson Granite Ltd., personal communication, 2001). Homogenous, medium-grained, pink granite is produced from a granite plug, which is part of the Dryberry batholith. Fracturing is negligible, allowing for removal of blocks of virtually any size.

Nelson Granite Ltd. continued production at their Red Deer Lake quarry (B) in 2000. The quarry is located on the north shore of Red Deer Lake, approximately 40 km northeast of Kenora and 15 km northwest of the railway stop at Jones. A total of 850 m^3 (30 000 ft^3) were produced for use as monument stone (N. Nelson, Nelson Granite Ltd., personal communication, 2001). The stone is marketed as "Red Deer Brown" or "Canadian Mahogany" and was primarily shipped to clients in North American markets. The stone is reddish-brown and is composed of pink, potassium feldspar phenocrysts in a fine- to medium-grained matrix of potassium and plagioclase feldspars, quartz and biotite. The granite formation is part of the Lount Lake batholith and is very massive with few, widely spaced fractures. Sheeting, or horizontal fracturing is spaced from 1 to 5 m and greater allowing for extraction of large blocks (Hinz, Landry and Gerow, 1994).

Nelson Granite Ltd. continued to produce stone from their Forgotten Lake quarry (C) in 2000. The quarry is located on the east side of Forgotten Lake, approximately 35 km north of Kenora and 10 km north of the hamlet of Redditt. The quarry can produce two colours, a green megacrystic granite marketed as "Pine Green" and a yellow megacrystic granite sold as "Crystal Gold". A total of 2832 m^3 (100 000 ft^3) of "Pine Green" stone were produced and sold to North American markets (N. Nelson, Nelson Granite Ltd., personal communication, 2001). The stone is a medium- to coarse-grained, porphyritic granite composed of yellow, potassic feldspar phenocrysts in a matrix of plagioclase, potassic feldspar, quartz and biotite. The granite, which is part of the Lount Lake batholith, is yellow at the surface and green at depth. The granite contains very few fractures; joints are spaced 2 to 3 m apart and sheeting is 1 to 2 m at the surface (Hinz, Landry and Gerow, 1994).

Nelson Granite Ltd. continued on demand production at their Snook Lake quarry (D) in 2000. The quarry is located approximately 50 km northwest of Kenora and 23 km north of the hamlet of Minaki. A total of 85 m^3 (3000 ft^3) were produced for monumental stone use, under the market name "Canyon Red" (N. Nelson, Nelson Granite Ltd., personal communication, 2001). The stone is composed of pink and red, potassium feldspar phenocrysts in a matrix of potassium feldspar, quartz and biotite. (Hinz, Landry and Gerow, 1994).

Nelson Granite Ltd. started production at their Shepody quarry (E) in 2000. The quarry is located approximately 45 km north of Kenora and 15km northwest of the railway stop at Jones. A total of 71 m^3 (2500 ft^3) were produced in 2000 mainly for construction and dimension stone use and marketed under the name "Shepody" (N. Nelson, Nelson Granite Ltd., personal communication, 2001). The stone is a medium- to coarse-grained, porphyritic granite composed of potassic feldspar phenocrysts in a matrix of plagioclase, potassic feldspar, quartz and biotite. The granite is part of the Lount Lake batholith.

Decorative Stone

Thorgrimson Stone Art Inc.

In early 2000, **Thorgrimson Stone Art Inc.** removed approximately 200 tons of soapstone by ice road from their Eagle Lake quarry (F). The quarry is located on the southwest shore of Eagle Lake, approximately 38 km west-southwest of the city of Dryden. The soapstone is currently being sold for carving purposes to the Northwest and Nunavut territories, the United States and across Canada. The company has obtained a 21-year lease to ensure future production (P. Thorgrimson, Thorgrimson Stone Art, personal communication, 2001).

Table 1. Assessment files received in the Kenora District in 2000.

Abbreviations

AEM	Airborne electromagnetic survey
AM	Airborne magnetic survey
ARA	Airborne radiometric survey
Beep	Beep Mat survey
Bulk	Bulk sampling
DD	Diamond drilling
DDH	Diamond drill hole(s)
DGP	Down-hole geophysics
GC	Geochemical survey
GEM	Ground electromagnetic survey
GL	Geological Survey
GM	Ground magnetic survey
GRA	Ground radiometric survey
Grav	Gravity survey
HLEM	Horizontal loop electromagnetic survey
HM	Heavy mineral sampling
IM	Industrial mineral testing and marketing
IP	Induced polarization survey
Lc	Linecutting
Met	Metallurgical testing
OD	Overburden drilling
ODH	Overburden drill hole(s)
OMIP	Ontario Mineral Incentive Program
OPAP	Ontario Prospectors Assistance Program
PEM	Pulse electromagnetic survey
PGM	Platinum group metals
Pr	Prospecting
RES	Resistivity survey
Samp	Sampling (other than bulk)
Seismic	Seismic survey
SP	Self-potential survey
Str	Stripping
Tr	Trenching
UG	Underground exploration/development
VLEM	Vertical loop electromagnetic survey
VLFEM	Very low frequency electromagnetic survey

Township or Area	Company Name	Year	Type of Work	AFRO Number	Resident Geologist Office File Designation
Armit Lake Area	Northern Canada Mines Ltd	1999	Lc, GEM, GC, Samp	2.19688	52J07NW AS-45
Aubrey Township	Teck Exploration Ltd	1998	DD 5-1685m, Samp	2.19937	52F14SE D-5
Bennett Lake Area	Cousineau, Louis	1998	GL, Samp, Str	OPAP	52C16SW AA-10
Bennett Lake Area	Vision Exploration	2000	Pr, STr, Samp, 2 DD-125m	2.20496	52C16SW CC-1
Boyer Lake Area	Goldeye Explorations Ltd	1999	Samp, GL	2.19651	52F07NE III-3
Boyer Lake Area	Goldeye Explorations Ltd	1999	GL, GEM, Samp, Pr	2.19800	52F07NE III-4
Boyer Lake Area	Kozowy, Alex	1999	GL, Samp	2.19838	52F07NE JJJ-1
Bridges Township	Nelson Granite	2000	DD 4-27m	2.20322	52F13SE N-9
Brooks Lake Area	Chute, Michael E.	1998	GL, Samp	OPAP	52F04NE Z-4
Brooks Lake Area	Nuinsco Resources Ltd	1999	DD 4-228.6m	2.19799	52F04NE AA-2

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Township or Area	Company Name	Year	Type of Work	AFRO Number	Resident Geologist Office File Designation
Clearwater Bay Area	Emerald Fields Resources Corporation	2000	GEM	2.20142	52E10NE II-1
Code Township	Etherington, Robert	1999	GL, Samp, GEM	2.20137	52E09SE EE-3
Conant Township	Prospectors Alliance Corp	1997	DD 7-1057m, Samp	2.19758	52J07SE FX-104
Contact Bay Area	Sovereign, W.J.	1998-99	Str, Samp	2.20035	52F10NW SS-2
Dash Lake Area	Chute, Michael E.	2000	Pr, Samp, GL	2.20467	52F04SE S-1
Dogpaw Lake Area	Avalon Ventures Ltd	1998	DD 4-512m, Samp	2.20073	52F05SW FFFF-5
Dogpaw Lake Area	Starcore Resources Ltd	1999	GC	2.19994	52F05SW GGGG-3
Drayton Township	Glatz, Alexander	1998	Pr, Samp, VLFEM	2.19444	52J04SW AO-33
Drope Township	Kozowy, Alex	1998	GL, Samp	OPAP	52F15NE 32
Eagle Rock Lake Area	Champion Bear Resources Ltd	2000	GL, Str, Samp	2.20548	52F02NE D-2
Eagle Rock Lake Area	Champion Bear Resources Ltd	2000	DD 8-943m, Samp	2.20516	52F02NE D-3
FourBay Lake Area	Best, A.	1997	DD 3-240m, Samp	2.20177	52J02SW 103
Grebe Lake Area	Ramsay, R.	1994	Samp	OPAP	52J07NE 56
Halkirk Township	Cousineau, Louis	2000	Tr, Samp, GL	2.20131	52C11NE G-6
Herony Lake area	Hornby Bay Exploration Ltd	2000	Pr, Samp, GL	2.20493	52F04NW FF-3
Houghton Lake Area	Carle, Robert J.	1997	Pr, GL, GM, GEM, Samp	2.19674	52J07SW AW-34
Jackman Township	Nelson Granite	2000	P, Str, GL	2.20326	52E16SE F-1
Jutten Township	Angrove, R.	1998	Str, Samp, GM, GEM	2.19282	52J08NW BU-52
Jutten Township	Band Ore Resources Ltd.	2000	DD 7-253m, Samp	2.20359	52J08NW 54
Jutten Township	Band Ore Resources Ltd.	2000	DD 1-48m, Samp	2.20430	52J08NW 55

Township or Area	Company Name	Year	Type of Work	AFRO Number	Resident Geologist Office File Designation
Jutten Township	Cranton, C.S.	1998	Tr, Samp	OPAP	52J08NW 53
Kabik Lake Area	Brown, Daniel P.	1998-99	GL, Samp, Pr	2.20219	52F16NE 65
Kilgour Lake Area	Nelson, Carter	1998	Samp, Str	2.20107	52K04SW A-3
Kilgour Lake Area	Nelson, Carter	1999	DD 4-27m	2.19840	52K04SW A-2
Kirkup Township	Zebruck, George	1998	GL, Samp	OPAP	52E09NW JJJ-2
Le May Township	Pogson, Gordon	2000	Pr, Tr	2.20450	52E09NE C-2
Line Lake Area	Crystal Quartz Canada Inc.	1999	GL	2.20019	52F11SW R-1
Little Turtle Lake Area	Hrexagon Gold Ltd	1999	DD 4-457m, Samp	2.20210	52C15SE RR-1
Lomond Township	Stuarton Resources Ltd	1999	GM, Pr, Lc, Samp	2.19873	52K01SW BD-41
Lower Manitou Lake Area	Glatz, A. & Woitowicz, M.	1999	Pr, Str, Samp, GEM	OPAP	52F07SW JJ-2
McAree Township	Tri Origin Exploration Ltd	1995	GL, Lc, IP, Tr, Pr	2.16393	52F16NW ES-93
McAree Township	Tri Origin Exploration Ltd	1997	GL, Samp, GC, Tr	2.17965	52F16SE EX-97
McAree Township	Tri Origin Exploration Ltd	1997	GC	2.17967	52F16SE EY-98
McIlraith Township	Stuarton Resources Ltd	1998	Pr, GL, Lc, Samp	2.19906	52K01SW BC-40
McIlraith Township	Stuarton Resources Ltd	1999	GEM	2.20218	52F15NE AL-28
McIlraith Township	Stuarton Resources Ltd	1999	DD 2-262m, Samp	2.20144	52F15NE AM-29
Meggisi Lake Area	Webster, Blaine	1999	RES	2.20038	52F07SE B-8
Osaquan Township	Kenora Granite Company Ltd	1998	GL, Samp	2.20458	52G05NW L-1
Patterson Lake Area	Tantalum Mining Corp. Ltd	1998	GC, GL,	2.20238	52L07SE Q-5

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Township or Area	Company Name	Year	Type of Work	AFRO Number	Resident Geologist Office File Designation
Patterson Lake Area	Tantalum Mining Corp. Ltd	1998-99	GC	2.20039	52L07SE Q-4
Patterson Lake Area	Tantalum Mining Corp. Ltd	2000	Met, IM	2.20571	52L07SE Q-6
Perrault Lake Area	Kuryliw, CJ.	1998	Pr, GL, Samp	2.20374	52K06SE B-1
Raleigh Lake Area	Avalon Ventures Ltd	1999	DD 5-602m, Samp	2.20005	52G05NW K-2
Revell Lake Area	Kuryliw, CJ.	1998	Pr, Samp, G, IM	2.20373	52F08NE D-1
Revell Township	Fairservice, Robert	2000	GC, Pr	2.20562	52F09SE S-2
Sixmile Lake Area	Noranda Exploration Co Ltd	1999-00	DGP, IP, Res, Seismic	2.20367	52G15NW 111
Swan Lake Area	J A Minor	1998-99	GL	2.20074	52L02SW C-4
Swan Lake Area	Minor, J.A.	2000	Str, Samp	2.20325	52L02SW C-5
Tabor Lake Area	Kuryliw, CJ.	1998	Pr, Str, GL	2.20372	52F09SW DD-3
Treelined Lake Area	Champion Bear Resources	1999	GL	2.20138	52L08SW K-11
Webb Township	Champion Bear Resources	1998	GM	2.19034	52F16NW FA-99
Webb Township	Glatz, Alexander	1998	Tr, Str	2.19352	52F15NE AK-27
Webb Township	Glatz, Alexander	1999	DD 2-102m, GL, Samp	2.20478	52F15NE 33
Webb Township	Stuarton Resources Ltd	1998	GM, GC, Samp	2.20144	52F15NE AN-30
Webb Township	Stuarton Resources Ltd	1998	GC	2.20217	52F15NE AO-31
Whipper Lake Area	Kuryliw, CJ.	1998	GL, GM, Samp	2.19759	52K01SW BC-39
Wiley Bay Area	Johnson, S.	1999	Pr, Samp, Str	2.20220	52E10SE Z-1
Wonderland Lake Area	Minor, J.A.	1999	Pr, Samp, Str, GL	2.20223	52L01SE G-1
Wonderland Lake Area	Nelson, Carter	1999	Samp, Res	2.19939	52L01SE B-10

Township or Area	Company Name	Year	Type of Work	AFRO Number	Resident Geologist Office File Designation
Zealand Township	Teck Exploration Ltd	1995-98	115 DD- 30,526m Samp	2.20559	52F15SE Y-15
Zealand Township	Teck Exploration Ltd	1997-98	DD 12-4583m, Samp	2.20442	52F15SE Y-14
Zealand Township	Teck Exploration Ltd	1998	DD 16-5246m, Samp	2.20108	52F15SE Y-12
Zealand Township	Teck Exploration Ltd	1998	DD 7-1656m, Samp	2.20444	52F15SE Y-13
Zealand Township	Teck Exploration Ltd	1998	DD 12-1452m, Samp	2.20602	52F15SE Y-16

EXPLORATION ACTIVITY

A complete summary of exploration activity, including prospecting, is given in Table 2. Gold, rare-metal pegmatites, platinum group elements and granite were the predominant targets in 2000. Described below are programs with significant exploration expenditures and/or known results. Exploration information included in this section is taken from assessment files in the Kenora District office, unless otherwise indicated. Programs are keyed with numbers in parentheses to Table 2 and Figure 1.

Platinum Group Elements

Champion Bear Resources Ltd.

Champion Bear Resources Ltd. has 100% interest in the Eagle Rock platinum, palladium, gold, copper property (4). The property consisting of 28 unpatented mining claims is located approximately 64 km due south of the city of Dryden, Ontario. The property was previously worked by Noranda Mines Ltd. from 1969 to 1974, when electromagnetic (EM), magnetic, and induced polarization (IP) geophysical surveys were conducted, followed by 1064 m of diamond drilling. In 1986, BP Resources Canada Ltd. conducted reconnaissance work and found anomalous PGE values in samples taken from Noranda's abandoned drill core. An airborne gradiometer and EM geophysical survey was flown over the property in 1987, followed in 1988 by detailed geological mapping, sampling and a diamond-drill program. Work by these companies outlined a mineralized zone over a strike length of 1100m. Champion Bear entered in an option agreement on the property and began their exploration work in 1997. Champion Bear completed fifteen diamond drill holes, ER1 – ER15, for 1254m in 1999 on the renamed Campbell zone.

Champion Bear completed an additional eight diamond drill holes, ER16 – ER23, for 943 m during the winter months of 2000 on the southeast extension of the Campbell zone. The Campbell zone has been traced by diamond drilling and surface mineralization, for an additional 800 m to the southeast, for a total length of 1900 m, with an average width in excess of 25 m (Press Release, Champion Bear Resources Ltd., May 26, 2000). Additional diamond drilling is planned in 2001.

Champion Bear contracted Process Research Associates Ltd. to conduct a metallurgical scoping study on the Cu-PGE mineralization. Open cycle flotation studies on Campbell zone drill core, hole ER8, returned 0.85% Cu, 0.18% Ni, 0.23 g/t Pd, 0.24 g/t Pt, 13 g/t Ag, and .34 g/t Au (Press Release, Champion Bear Resources Ltd., October, 31 2000).

Gold

Band-Ore Resources Ltd.

Band-Ore Resources Ltd. continued exploration on the Stillar Bay gold property (3) in the Savant Lake area. The property is located in the northern part of Jutten and southern part of Poisson townships, 25 km northeast of the hamlet of Savant Lake. Surface sampling in 1999 returned assays up to 16.11 g/t Au (Press Release, Band-Ore Resources Ltd., July 1 2000). In 2000, Band-Ore conducted an eight hole, 301 m diamond drill project on the property in 2000. Anomalous assay results were obtained from siliceous pyrite, pyrrhotite and arsenopyrite mineralized iron formation intersected in the drill holes. Drill core samples returned the following assays: SB-01, 0.3 g/t Au; SB-02 2.9 g/t Au and SB-04 4.7 g/t Au. Band-Ore Resources has returned the Stillar Bay property back to M. Stares, the original vendor.

Nuinsco Resources Ltd.

Nuinsco Resources Ltd. continued exploration of their Rainy River project targeting gold, base metal and platinum group elements (36). Following the discovery of the #17 gold and # 34 base-metal zones in 1995, further exploration was hampered by the presence of highly conductive overburden which effectively masked bedrock conductors. Lack of a more powerful geophysical survey tool prevented additional exploration across the Rainy River greenstone belt.

In mid-2000, a deep penetrating, time-domain airborne geophysical survey capable of penetrating the thick surficial tills was carried out over part of the Rainy River greenstone belt. Follow-up ground geophysical surveys are planned in the future (D. Hume, Nuinsco Resources Ltd., personal communication, 2001).

Western Troy Capital Resources Inc.

Western Troy Capital Resources Inc. conducted exploration on the Wagg prospect (45). The property, a narrow, high grade gold showing is located at the border of Menary and Senn townships, located 18 km south of the hamlet of Nestor Falls, 2 km east of Hwy 71 via logging road 404.

In 1992, 350 ounces of gold were recovered from a 1000 tonne bulk sample extracted from a series of high grade gold veins (A, B, C, D, E, F).

In 2000, Western Troy Capital Resources completed additional staking, VLF-EM, ground magnetometer geophysical surveys and a nine hole diamond drill program totaling 739 m. One drill hole tested a VLF-EM anomaly, located 2.5 km northeast of the Wagg prospect. Eight of the drill holes tested the gold veins at the Wagg Prospect and four holes returned the following gold values: (S. Mourin, Western Troy Capital Resources, personal communication, 2001)

WAGG 00-02	0.89m of 0.992 g/t Au in silicified porphyry
WAGG 00-04	0.63m of 9.994 g/t Au in B vein (VG)
WAGG 00-05	0.41m of 2.978 g/t Au in B vein and 0.39m of 7.146 g/t in A vein
WAGG 00-08	0.49m of 13.933 g/t Au in F vein and 0.80m of 4.901 g/t in E vein

Rare-metals

Avalon Ventures Ltd.

Avalon Ventures Ltd. Big Whopper Rare-Metal pegmatite is located 60 km north of Kenora (1). Geological mapping and diamond drilling have delineated the Big Whopper pegmatite system over a strike length exceeding 1.5 km, with widths ranging from 10 to 80 m and to a vertical depth of approximately 300 m, where it remains open. The drilling program defined a total petalite resource calculated at 11.6 million tonnes grading 1.34% Li_2O and 0.30% Rb_2O (www.avalonventures.com).

The principal commodities identified in the Big Whopper pegmatite to date are petalite, tantalum and rubidium-rich potassium-feldspar. The Big Whopper also contains substantial quantities of lepidolite, a lithium, rubidium-mica which is the principal ore mineral for rubidium metal.

Wabaseemoong Independent Nations and Avalon Ventures Ltd. signed a Memorandum of Understanding in 1999, and are currently negotiating an Impact and Benefits Agreement.

Avalon Ventures continued market studies and studied the metallurgical process of feldspar extraction from the Big Whopper deposit. Avalon also conducted a compilation of regional and property scale data of lithogeochemical, ground and airborne magnetic surveys. Based upon a 1999 pre-feasibility study, Avalon Ventures plans a full feasibility study in 2001 including a 5000 tonne bulk sample (Ian Campbell, Avalon Ventures Ltd., personal communication, 2001).

Emerald Fields Resource Corporation

Emerald Fields Resource Corporation (10) continued work on their rare-metal pegmatite, Big Mack Project located 60 km north of Kenora. Sixty-seven contiguous claims consisting of approximately 12 900 hectares extends from the Big Mack Pegmatite west, 73 km, to Tantalum Mining Corporation's, Bernic Lake property in Manitoba. An access road to the Big Mack property was completed in February 2000.

The surface exposure of the Big Mack pegmatite is approximately 25 m wide by 200 m long. In 1998, Emerald Fields removed a five tonne bulk sample from a 30 m trench across the Big Mack Pegmatite for metallurgical evaluation. This sample registered a lithium oxide (Li_2O) value of 4.85 % (A. Mowatt, Emerald Fields Resource Corporation, personal communication, 2001).

In April 2000 AMZIM Minerals Ltd., the holding company of Bikita Minerals Ltd., Zimbabwe and Emerald Fields Resource Corporation concluded an agreement, which specifies that Bikita will assist and support Emerald Fields Resource Corp. in the evaluation of the products to be produced by Emerald Fields, as well as giving access to production technologies employed by Bikita (Press Release, Emerald Fields Resource Corp., April, 2000).

Wabaseemoong Independent Nations and Emerald Fields Resource Corporation signed a Memorandum of Understanding in 1999.

Tantalum Mining Corporation of Canada Ltd. (Tanco)

In December of 2000 Tanco and joint venture partner Gossen Resources Limited initiated a 730 m diamond drill program on the cesium-rubidium-lithium anomalies identified during a 1998 enzyme leach sampling program on the Separation Rapids Property (43). One anomaly was tested with three drill holes. The results of this drilling are pending. The property is located 60 km due north of the City of Kenora, northeast of the Separation Rapids area (P. Vanstone, Tanco, personal communication, 2001)

Base Metals

Inco Limited

Inco Limited conducted a re-interpretation of its past airborne geophysical survey data (21-26). Prospecting, Beep Mat and VLF-EM surveys were conducted on six properties in the Kenora District. Sulphide rich iron formations are the interpreted explanation for all airborne electromagnetic conductors. No further work is planned for these properties (W. Vanderklift, Inco Limited, personal communication, 2001).

Noranda Inc.

Noranda Inc. conducted borehole physical property surveys to collect data from three diamond drill holes on the south Sturgeon Lake base metal property during 2000 (34). The Sturgeon Lake Property is located 13 km east of the hamlet of Silver Dollar and covering the past producing mines of Lyon Lake, Sturgeon Lake and Mattabi. The borehole physical property measurements collected include inductive conductivity, magnetic susceptibility, natural gamma, neutron-neutron, density, and full wave sonic data.

Table 2. Exploration activity in the Kenora District in 2000.

Abbreviations

AEM ..... Airborne electromagnetic survey	Lc ..... Linecutting
AM ..... Airborne magnetic survey	Met ..... Metallurgical testing
ARA ..... Airborne radiometric survey	OD ..... Overburden drilling
Beep ..... Beep Mat survey	ODH ..... Overburden drill hole(s)
Bulk ..... Bulk sampling	OMIP ..... Ontario Mineral Incentive Program
DD ..... Diamond drilling	OPAP ..... Ontario Prospectors Assistance Program
DDH ..... Diamond drill hole(s)	PEM ..... Pulse electromagnetic survey
DGP ..... Down-hole geophysics	PGM ..... Platinum group metals
GC ..... Geochemical survey	Pr ..... Prospecting
GEM ..... Ground electromagnetic survey	RES ..... Resistivity survey
GL ..... Geological Survey	Samp ..... Sampling (other than bulk)
GM ..... Ground magnetic survey	Seismic ..... Seismic survey
GRA ..... Ground radiometric survey	SP ..... Self-potential survey
Grav ..... Gravity survey	Str ..... Stripping
HLEM ..... Horizontal loop electromagnetic survey	Tr ..... Trenching
HM ..... Heavy mineral sampling	UG ..... Underground exploration/development
IM ..... Industrial mineral testing and marketing	VLEM ..... Vertical loop electromagnetic survey
IP ..... Induced polarization survey	VLFEM ..... Very low frequency electromagnetic survey

No	Company/Individual (Occurrence Name) or Property	Township/Area (Commodity)	Exploration Activity
1	Avalon Ventures Ltd. (Big Whopper Property)	Paterson Lake Area (Li, Cs, Rb, Ta)	Met
2	Avalon Ventures Ltd. (Raleigh Lake Property)	Raleigh Lake Area (Li, Cs, Rb, Ta)	Pr, GL, Samp
3	Band-Ore Resources Ltd. (Stillar Bay Property)	Jutten Township (Au, Ag)	DD, Samp
4	Champion Bear Resources Ltd. (Eagle Rock Property)	Eagle Rock Lake Area (PGE, Au, Cu, Ni)	DD, GL, Str, Samp
5	Chute, M. (Dash Lake Property)	Dash Lake Area (Au, Ag, Cu, Zn)	Pr, Samp, GL
6	Cousineau Brothers (Halkirk Soapstone Property)	Halkirk Township (Stone)	Pr, GL, Str, Samp
7	Cousineau Brothers	Halkirk Township (Diamonds)	Pr, GL, Samp
8	Cousineau, L. (Halkirk Property)	Halkirk Township (Au, PGE)	Tr, Samp, GL
9	Emerald Fields Resource Corp. (Parth Lake Property)	Clearwater Bay Area (Au)	GEM
10	Emerald Fields Resource Corp. (Big Mack Property)	Paterson Lake Area (Ta, Li, Cs, Rb)	GL, Samp
11	Etherington, R. (Etherington-Thompson Property)	Code Township (Au, Cu, Zn)	Pr, Samp
12	Fairservice, R. (Revell Twp Project)	Revell Township (PGE, Au, Cu, Ni)	GC, Pr
13	Glatz, A. (Revell Twp Property)	Revell Township (PGE, Au, Cu, Ni)	Pr, Samp
14	Glatz, A. & Kozowy, A. (Nabish Lake Property)	Contact Bay Area (PGE)	Pr, Samp
15	Glatz, A. & Kozowy, A. (Tot Lake Property)	Webb Township (Cs, Li, Ta, Rb)	Pr, Samp
16	Glatz, A. & Riives, J. (Hyndman Property)	Hyndman Township (PGE)	Pr, Samp
17	Glatz, A. & Riives, J. (Pincher Lake Property)	Turtlepond Lake Area (PGE)	Pr, Samp
18	Glatz, A. & Woitowicz, M. (Gullwing Lake Property)	Webb Township (Ta, Rb, Li, Cs)	Pr, Samp
19	Hexagon Gold (Ontario) Ltd. (Nugget and Baseline Vein Occurrences)	Bad Vermilon Lake Area (Au)	Str, DD, Samp
20	Hornby Bay Exploration Ltd. (Kakagi Lake Project)	Godson Township (Au, Ag, Cu, Zn, PGE)	Pr, Samp, GL
21	Inco Limited (Pipestone Lake Property)	Dash Lake Area (Cu, Ni, PGE)	Pr, Beep
22	Inco Limited (Hilltop Lake Property)	Hilltop Lake Area (Cu, Ni, PGE)	Pr, Beep, VLFEM
23	Inco Limited (Duggan Lake Property)	Hilltop Lake Area (Cu, Ni, PGE)	Pr, Beep, VLFEM
24	Inco Limited (Jackfish Lake Property)	Otukamamoan Lake Area (Cu, Zn, Au)	Pr, Beep
25	Inco Limited (Vanessa Lake Property)	Seseganaga Lake Area (Cu, Ni, PGE)	Pr, Beep, VLFEM
26	Inco Limited (Stormy Lake Property)	Wapageisi Lake Area (Cu, Ni, PGE)	Pr, Beep
27	Johnson, S. (Mile Lake Property)	Contact Bay Area (PGE, Cu, Ni)	Pr, Samp

No	Company/Individual (Occurrence Name) or Property	Township/Area (Commodity)	Exploration Activity
28	Kilburn, L. (Needle Lake Property)	Webb Township (Au, Cu, Zn)	Pr, Samp, GC
29	Minor, J.A. (White Dog Dam Property)	Swan Lake Area (Stone)	Str, Samp
30	Nelson Granite (Crabclaw Lake Property)	Bridges Township (Stone)	DD, GPR
31	Nelson Granite (Silver Lake Property)	Jackman Township (Stone)	P, Str, GL
32	Nelson Granite (Kilgor Lake Property)	Kilgor Lake Area (Stone)	Bulk, IM
33	Mustang Minerals Corp. (Polygon Lake Occurrence)	Bennett Lake Area (PGE, Cu, Ni)	Pr, Samp
34	Noranda Exploration Company Ltd. (Mattabi Property)	Sixmile Lake Area (PGE, Cu, Ni)	DGP, IP, Res, Seismic
35	Nuinsco Resources Ltd. (Isinglass Lake Property)	Atikwa Lake Area and Rowan Lake areas (PGE, Cu, Ni)	Pr, Samp
36	Nuinsco Resources Ltd. (Rainy River Property)	Richardson Township (PGE, Cu, Ni, Au)	AEM, AM
37	Pogson, G. (Nabob Lake Property)	Le May Township (Au)	Pr, Tr
38	Pogson, G. (Menary Township Property)	Menary Township (Zu, PGE)	Pr, Samp
39	Riives, J. (New Millenium Property)	Zarn Township (Zu, PGE)	Pr, Samp
40	Scheiber, M. (Candy Hill Property)	Shenston Township (Au)	Pr, Samp
41	Stares Contracting Corp. (Savant Lake Property)	Beckington Lake Area and Boucher Township (Cu, Ni)	Pr, Samp
42	Stares, S. & Stares, M. & O'Toole, J. (Bad Vermilion Property)	Bad Vermilion Lake and Bliss Lake areas (Cu, Ni)	Pr, Samp
43	Tantalum Mining Corp. Ltd. & Gossen resources Limited (Separation Rapids Property)	Patterson Lake Area (Ce, Ta, Li, Rb)	Met, IM, DD
44	Vision Exploration (Bennett Lake Property)	Bennett Lake Area (Au, Ag, Cu, Zn)	Pr, STr, Samp, DD
45	Western Troy Captial Inc. (Wagg Property)	Menary Township (Au)	DD, Samp, IP

LAND USE PLANNING

A total of 20 Ontario Living Legacy sites in the Kenora District were designated to be regulated in 2000, five are Provincial Parks and fifteen are Conservation Reserves. The Kenora office responded to eight applications for subdivision and four applications for land withdrawls. The Kenora office provided comments on two Official Plans and Zoning By-Law proposals, the Township of Sioux Lookout and the Township of Machin, for the Ministry of Municipal Affairs and Housing.

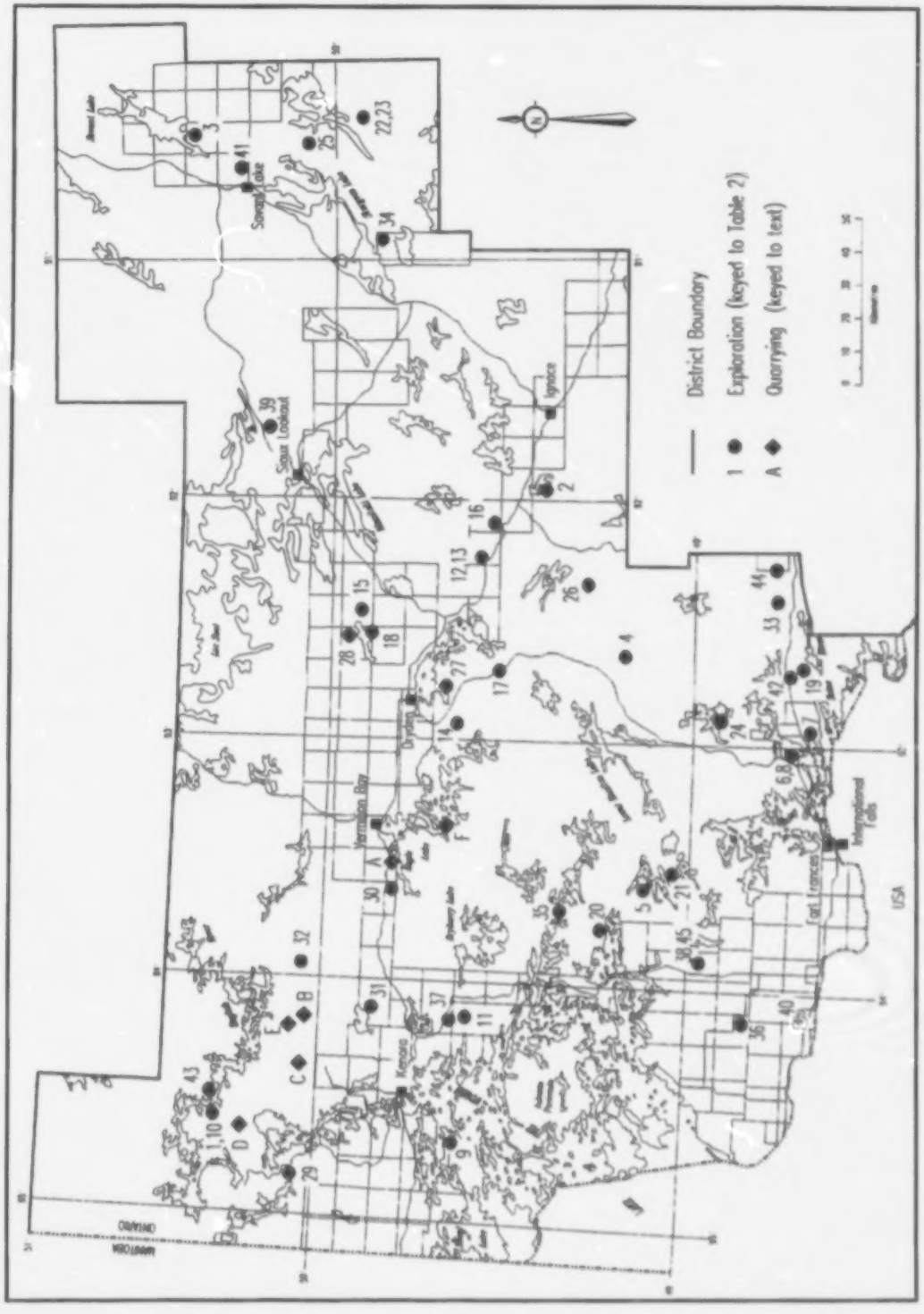

Figure 1. Exploration and quarry activity in the Kenora District in 2000.

RESIDENT GEOLOGIST PROGRAM STAFF AND ACTIVITIES

The Kenora office was staffed by: P. Hinz, District Geologist (January – July); C. Ravnaas, District Support Geologist (April – July), District Geologist (July – present); A. Raoul, Acting District Geologist (July – December); C. Blackburn, Acting District Support Geologist (January – March); J. Lowen and A. Green summer assistants.

C. Ravnaas assumed the responsibilities as Kenora District Geologist, with the primary focus in the Sioux Lookout area and A. Raoul assumed the responsibilities as acting Kenora District Geologist, in July.

P. Hinz and C. Ravnaas attended the Prospectors and Developers Association of Canada Convention in Toronto, in March, staffing the Northwestern Ontario regional display. A poster and talk highlighting activities in the district and providing recommendations to prospectors was presented at the Northwestern Ontario Mines and Minerals Symposium, Thunder Bay in April. P. Hinz attended the Institute on Lake Superior Geology, Marquette, Michigan, May. P. Hinz and A. Raoul attended a joint field trip in the Mine Centre –Fort Frances area with the Minnesota Geological Services and students of the University of Minnesota in August. C. Ravnaas and A. Raoul presented MNDM information sessions for the prospectors, mineral exploration industry and general public in Dryden and Fort Frances during the fall. C. Ravnaas and A. Raoul represented MNDM Northwestern Ontario's offices at the Manitoba Mining and Minerals Convention, Winnipeg, Manitoba in November.

During 2000, the staff of the Kenora District office conducted 29 property visits, inspections and examinations (Table 3, Figure 2). A total of 400 Mineral Deposit Inventory records were edited, 40 records were deleted and 40 records were created. The District office handled 662 personal consultations and 474 telephone inquires.

Effective April 1st 2000 the Sioux Lookout District Geology office was closed. All assessment files and MNDM publications related to area south of 50° 45' latitude were moved to the Kenora office. The Sioux Lookout office will operate as a seasonal satellite office during the May to October summer field season. The field office in Sioux Lookout is maintained in conjunction with the Northern Development Office, with the District Geologist's present in the area three days every second week.

Ontario government publications related to each geographic area are available for examination at the Fort Frances, Ignace and Sioux Lookout Northern Development offices.

Property and Field Examinations

Major authorship for the following property and field examinations are in parentheses following the title. North American Datum (NAD 27) is the datum of all global position satellite coordinates presented.

Table 3. Property and field examination conducted by the Kenora District Geologists in 2000.

Number (keyed to Figure 2)	Property / Occurrence
1	Avalon Ventures Ltd. - Big Whopper property
2	Bond, J. - Mironsky prospect
3	Cousineau Brothers - Pit property
4	Cousineau Brothers - Swell Bay property
5	Emerald Field Resource Corp. - Big Mack property
6	Etherington, B. - Etherington-Thompson property
7	Glatz, A. and Woitowicz, M. - Gullwing Lake property
8	Hexagon Gold Ltd. - Nugget Vein occurrence
9	Johnson, S. - Mile Lake property
10	Johnson, S. and Bond, J. - Emmon Lake occurrence
11	Kilburn, L. - Needle Lake property
12	Kozowy, A. - Snake Bay occurrence
13	Schreibier, M. - Candy Hill property
14	Staff examination - Bending Lake VMS
15	Staff examination - Caliper Lake gabbro
16	Staff examination - Helldiver Bay ultamafic dikes
17	Staff examination - Halkirk Township lamprophyre dikes
18	Staff examination - Islets Lake stock
19	Staff examination - McAree Township lamprophyre dikes
20	Staff examination - Pike Lake gabbro
21	Staff examination - Port Arthur Copper occurrence
22	Staff examination - Rush Bay area
23	Staff inspection - Cedar Island Mine
24	Staff inspection - Duport Mine
25	Staff inspection - Goldlund Mine
26	Staff inspection - Sultana Mine
27	Tantalumn Mining Corp. Ltd. - Separation Rapids property
28	Thorgrimson Stone-Art - Eagle Lake Soapstone Quarry
29	Western Troy Capital Inc. - Wagg prospect

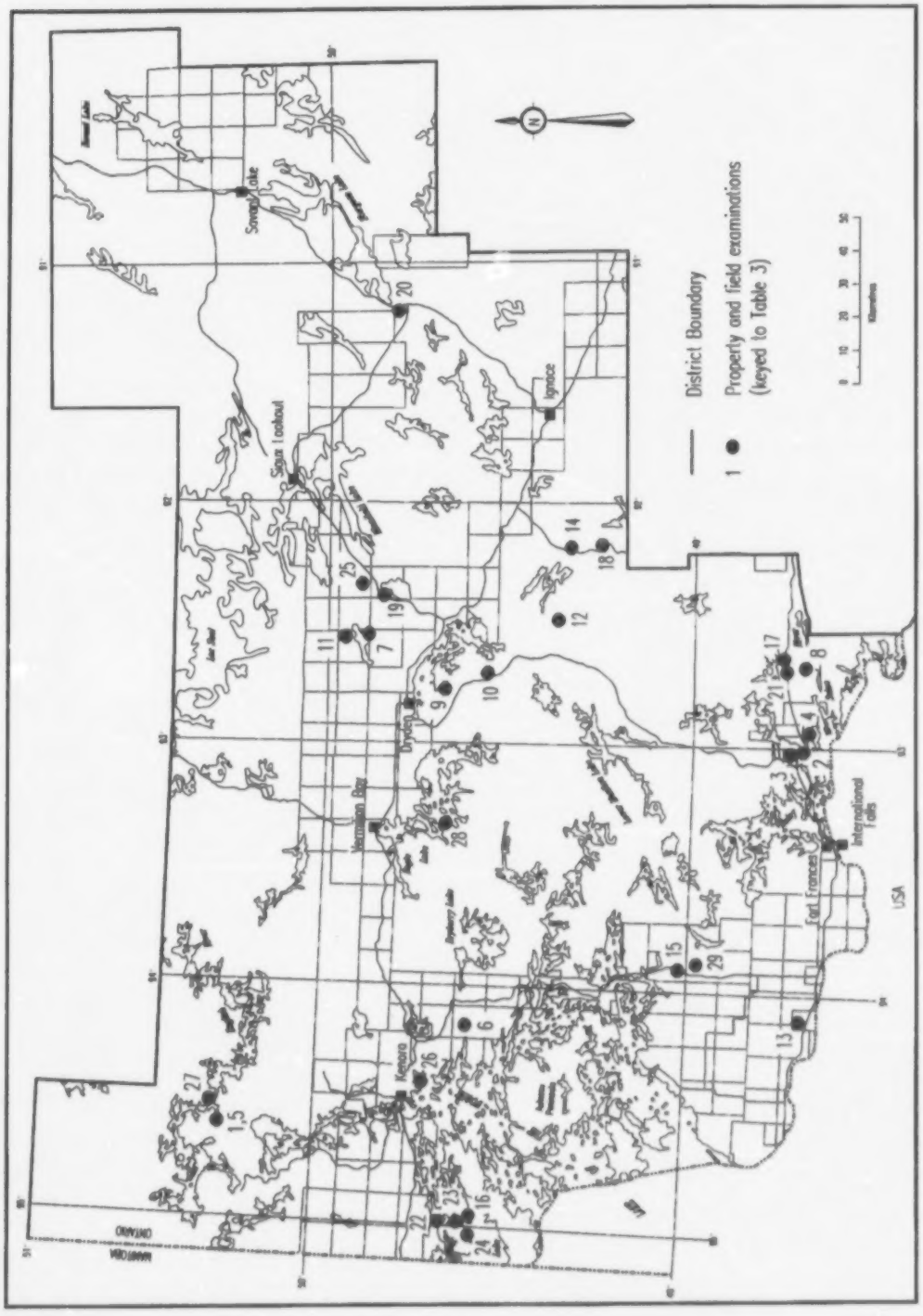

Figure 2. Property and field examinations conducted in the Kenora District in 2000.

Bending Lake VMS Examination, Highway 622 (A. Raoul)

During the summer of 2000, the author conducted a reconnaissance mapping and sampling program of the Bending Lake area. The examination consisted of geological mapping and sampling outcrops located along Highway 622. This highway traverses the area, from the south to the north, perpendicular to the stratigraphy. The objective of this program was to evaluate the potential of the area to host volcanogenic massive sulphide (VMS) mineralization through systematic sampling, lithogeochemical analysis and alteration studies.

The Stormy-Bending lakes area has been examined by Ontario Geological Survey Staff (Parker, Laderoute and Storey, 1992) and industry personnel (Ontario Geological Survey, 1979). These evaluations did not attempt to quantify the possible presence of hydrothermal alteration associated with volcanogenic massive sulphides (VMS) in the Bending Lake area. A geochemical survey by Noranda (Kenora Assessment Files 52F/08SW M-2) did evaluate hydrothermal alteration in the Stormy Lake area but did not include the southeastern Bending Lake area. Lithogeochemistry can be used to evaluate the presence of hydrothermal alteration within an area.

The area is located 32 km west-southwest of Ignace (52F/8SE). LTV Steel holds a series of patented mining claims on a main iron formation unit (Kenora Assessment Files 52F/08SW M-2). At the time of publication, the ground surrounding these patents was open for staking and exploration.

D. Laderoute described the general geology of the area in the 1992 Annual Report of Activities:

> The Stormy-Bending lakes area is entirely underlain by rocks of the Manitou-Stormy Lake greenstone belt, which are described in detail by Kresz et al. (1982a, 1982b) and Kresz (1987). In summary, north-northeast facing felsic metavolcanics rocks of the Wapageisi group, situated in the west and central parts of Stormy Lake, consist of proximal coarse tuff, lapilli tuff and tuff breccia which are gradational to the east into more distal, finer grained tuff and lapilli tuff. Metasedimentary rocks of the Stormy Lake group which consist of coarse polymictic and volcanic-clast-bearing conglomerates, quartzofeldspathic sandstone and thin intercalated felsic and mafic flows overlie these metavolcanic rocks. This facies is transitional eastward into distal turbidites that are intercalated with abundant iron formation (Blackburn et al., 1982).

Highway 622 provided access to map and sample the Bending Lake area from the Islet lake Stock north to the Revell Batholith. Sixty grab samples were collected for analysis during this examination. Selected major element geochemistry and metal analysis are presented in Table 6. Figure 3 illustrates the stratigraphy and sample locations of the area.

The Islets Lake Stock is a medium to coarse-grained, massive, diorite to quartz diorite intrusion with a strongly, foliated north contact zone (McWilliams, 1998).

North of the Islets lake Stock there is a 3000 m thick sequence of massive, and pillowed mafic volcanic flows with associated metasedimentary rocks comprised of argillite-greywacke. A 40 m wide, quartz diorite sill intrudes along the northern contact of the mafic flows. This sill may represent a major, fault-bounded, contact between the mafic flows and the felsic volcanic rocks to the north.

The felsic volcanic unit is a 2100 m thick sequence of unaltered to altered, dacitic to rhyolitic tuff with minor mafic flows. In the felsic volcanic rocks, weak sericite alteration is common. In small fracture zones, there are 0.5-3 m zones comprised of greater than 50% sercite-biotite-chlorite alteration with disseminated to stringer pyrite-chalcopyrite mineralization. In the mafic flows, chlorite alteration is common. There are small 0.1 to 2.0 m fracture zones of greater than 50% chlorite-biotite or garnet-anthophyllite alteration with trace-3 % pyrite mineralization. This stronger alteration and mineralization is typical of hydrothermal alteration associated with VMS deposition. A 52 m sequence of sulphide and

oxide facies iron formation is north of the felsic volcanic unit. The iron formation can be divided into the following south to north zones:
a) A 3 m zone of 20-25% pyrrhotite within altered felsic volcanic rock (sample 648).
b) A 15 m zone of strongly sheared and possibly altered, felsic volcanic rocks (no sample).
c) A 10 m zone of strongly bleached and possibly altered, felsic volcanic rock (no sample).
d) A 10m zone of chert with greater than 50% fine magnetite (sample 649).
e) A 5 m zone of 50% massive pyrrhotite with recrystallized chert breccia fragments (samples 650 and 651) hosted within an altered felsic volcanic rock (sample 652).
f) A 9 m zone of chert with greater than 30% fine magnetite (sample 653).

North of the iron formation, there is a 2000 m unit of greywacke metasediments. A 400-500 m wide gabbro plug intrudes the central part of these sediments. The gabbro is located along the hinge line of the Bending Lake Syncline (Kresz, 1987).

North of the metasediments, there is a 2000 m sequence of unaltered to altered felsic volcanic rocks with interstitial metasediments and minor mafic flows. To the north, the felsic volcanic rocks are in contact with the Revell Batholith. The batholith is comprised of medium-grained, pink, equigranular, granite.

The hinge line of the Bending Lake Syncline is located in the central part of the metasedimentary unit. South of the hinge line, there is a younging direction of the lithological units away from the Islet Lake Stock. North of the hinge line, there is a younging direction of the lithological units away from the Revell Batholith.

The Ore Score is a quantitative rating system of comparing alteration and mineralization (Raoul and Masson, 1998). The higher the Ore Score value the greater the indication of hydrothermal alteration and presence of base metal mineralization. Formulas shown in Table 5 were used to determine the Ore Score of selected alteration samples. The calculated values are presented in Table 7. Major element values in Table 6 were used to calculate the Ore Score.

Table 4. Ore score, alteration index, metal index and VMS mineralization potential ratings.

Ore Score Alteration Index + Metal Score	Alteration Index (0-9) Hashimoto Index + Sericite Index + Chlorite Index	Metal Index (0-11) (Cu + Zn + Ag mineralization) + Spitz Index	VMS Mineralization Potential
0-3	Low	low	nil
4-6	Moderate	moderate	low
7-9	High	high	low-moderate
10-12	-	very high	moderate
13-15	-	-	moderate-high
16-18	-	-	high
19-20	-	-	very high

Table 5. Index, formulas and alteration index scoring system.

Index	Formula	Alteration index value		
		Score 1	Score 2	Score 3
Hashimoto Index	$(MgO+K_2O) / (MgO+K_2O+ Na_2O+CaO)100$	>70	>80	>90
Sercite Index	$(K_2O) / (Na_2O+K_2O)$	>70	>80	>90
Chlorite Index	$(MgO+F_2O_3) / (MgO+Fe_2O_3+2CaO+2Na_2O)100$	>70	>80	>90
Spitz Index	Al_2O_3 / Na_2O	>25	>50	-
Cu and Zn		>100 ppm	>1000 ppm	>5000 ppm
Ag		> 1 ppm	>2 ppm	>5 ppm

Table 6. Major element geochemistry and Cu, Zn, Ag assays of alteration samples from the Bending Lake VMS examination.

Sample	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	MgO %	CaO %	Na_2O %	K_2O %	MnO %	P_2O_5 %	TiO_2 %	LOI %	Cu ppm	Zn Ppm	Ag ppm
614	61.78	15.42	4.87	3.90	4.68	4.17	3.01	0.07	0.18	0.55	0.83	31	72	N.D.
616	50.43	15.48	13.32	5.90	11.36	1.84	0.23	0.22	0.07	1.00	1.01	77	98	N.D.
619	43.94	15.35	13.31	12.68	9.86	1.56	0.22	0.19	0.02	0.65	2.57	14	81	N.D.
623	63.93	17.33	4.45	1.95	3.80	4.12	2.06	0.07	0.08	0.40	1.63	11	74	N.D.
624	64.33	15.82	4.35	2.24	4.24	4.32	1.60	0.07	0.21	0.60	1.91	32	66	N.D.
633	72.07	15.80	3.62	0.47	0.13	0.07	5.27	0.05	0.09	0.40	2.56	23	50	N.D.
637	50.52	14.06	11.46	7.48	11.68	1.03	0.50	0.30	0.37	0.67	2.33	15	88	N.D.
645	55.24	14.20	24.60	1.06	0.87	0.81	1.31	1.23	0.09	0.37	1.66	22	88	9
649	39.50	2.43	58.26	1.73	0.99	1.05	0.08	0.05	0.18	0.09	N.D.	N.D.	16	N.D.
650	32.33	6.26	50.52	2.03	0.42	0.23	0.65	0.91	0.18	0.29	8.90	151	91	N.D.
651	29.58	1.97	54.55	0.30	3.36	0.19	0.20	0.24	0.03	0.07	8.28	78	75	N.D.
689	61.98	16.48	5.13	1.91	2.52	6.09	2.49	0.08	0.27	0.71	1.63	49	103	N.D.
690	70.62	12.80	5.26	2.41	1.36	2.99	1.50	0.09	0.08	0.50	2.14	38	67	N.D.
691	49.01	19.18	10.46	5.26	10.04	3.06	0.91	0.15	0.10	0.97	1.12	127	93	N.D.
696	48.68	13.47	18.99	6.08	8.00	1.86	0.29	0.25	0.14	1.96	1.51	24	156	N.D.
701	52.13	17.69	8.28	1.60	15.70	1.31	0.24	0.12	0.08	0.76	1.34	81	75	N.D.
703	63.86	16.94	4.24	1.63	4.65	4.16	1.61	0.06	0.11	0.46	2.17	18	60	N.D.
708	59.42	16.11	7.17	2.85	7.38	3.04	0.93	0.13	0.14	0.63	2.27	57	77	N.D.
709	69.15	15.18	2.19	0.56	1.82	5.39	3.28	0.03	0.10	0.29	1.21	17	45	N.D.

N.D. not detected

Table 7. Alteration index, metal score and ore score of alteration samples from Bending Lake VMS examination.

Sample	Rock Type	Hashimoto	Sericite	Chlorite	Alteration Index	Cu	Zn	Ag	Spitz	Metal Score	Ore Score
614	Foliated Qtz Diorite	44	42	33	0	0	0	0	4	0	0
616	Pillow Basalt	32	11	42	0	0	0	0	8	0	0
619	Chloritic Basalt	53	12	53	0	0	0	0	10	0	0
623	Quartz Diorite	34	33	29	0	0	0	0	4	0	0
624	Felsic Volcanic	31	27	28	0	0	0	0	4	0	0
633	Sericitic Rhyolite	97	99	91	9	0	0	0	226	2	11
637	Mafic Dike	39	33	43	0	0	0	0	14	0	0
645	Altered Rhyolite	59	62	88	2	0	0	2	18	2	4
649	Magnetite-brg Chert	47	7	94	3	0	0	0	2	0	3
650	Massive Po+/-Cpy	80	74	98	6	1	0	0	27	2	8
651	Massive Po+/-Cpy	12	51	89	2	0	0	0	10	0	2
689	Siliceous Sediment	34	29	29	0	0	1	0	3	1	1
690	Greywacke	47	33	47	0	0	0	0	4	0	0
691	Fine Gabbro	32	23	38	0	0	0	0	6	0	0
696	Basalt	39	13	56	0	0	1	0	7	1	1
701	Pyritic Chert	10	15	23	0	0	0	0	14	0	0
703	Felsic Volcanic	27	28	25	0	0	0	0	4	0	0
708	Basalt	27	23	32	0	0	0	0	5	0	0
709	Granite	35	38	16	0	0	0	0	3	0	0

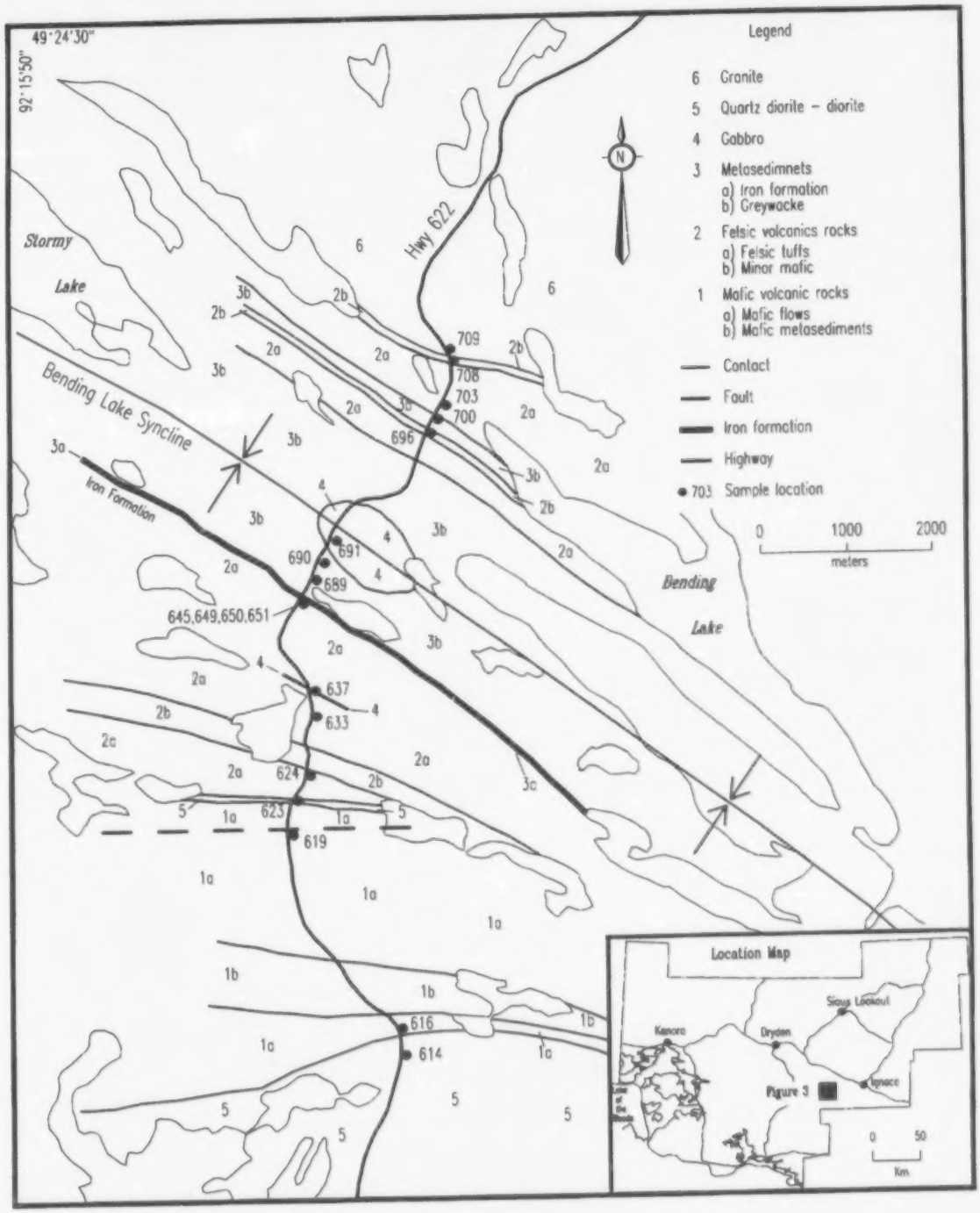

Figure 3. Geology and sample locations of the Bending Lake area (modified after Blackburn, 1978).

Samples which displayed significant alteration are discussed in detail below.

Sample 633 is fine-grained, foliated, altered rhyolite with greater than 20% sericite replacement. This sample shows a high alteration index of 9 with a Spitz index of 2 resulting in a moderate ore score of 11. The geochemistry of this sample shows that it is a rhyolite to rhyodacite with strongly depleted MgO, CaO and Na_2O while enriched in K_2O. This is a hydrothermally altered felsic volcanic rock with no sulphide mineralization. These are typical of the periphery of VMS stockwork zones.

Sample 650 is a fine-grained, massive pyrrhotite with clasts of 10-15% recrystallized chert breccia. This sample shows a moderate alteration index of 6, a copper rating of 1 (>100 ppm) and a Spitz index of 1 resulting in a low to moderate ore score of 8. A mass balance calculation was used because of the high composition of Fe_2O_3 (50%) that skews the geochemical evaluation of the sample. The sample has been depleted in CaO and Na_2O. This sample of iron formation is typical of distal- type, exhalitive mineralization because of the low Ba (137 ppm) and MnO values. High Ba (>1000 ppm) and MnO (>2 %) are indicative of proximal type exhalitive mineralization.

Hydrothermal alteration and sulphide mineralization typical of VMS environments were observed in the area. Detailed examination of the area should be conducted (*see* Recommendations Section, this report).

Etherington-Thompson Property, Code Township (A. Raoul)

The Etherington-Thompson Property is located in Code Township (NTS 52E/09SE), 28 km southeast of Kenora, Ontario. Access is by the Witch Bay road, located west of Highway 71. A copper occurrence, known as the Hulda occurrence, is located on mining claims 1178195-1178196.

R. Etherington, H. Etherington and L. Thompson have focused on the old gold showings in the area. During 2000, they targeted the mafic volcanic and intrusive rocks exploring for gold, base metal and platinum group elements (PGE). R. Etherington's 1997 OPAP project could not determine the source of this copper mineralization identified within the quartz veins and sheared gabbroic rocks.

The area was mapped by N. F. Trowell (1986) in Open File Report 5629. The area is underlain by rocks of the Lake of the Woods Greenstone Belt, Wabigoon Subprovince. In this area, the belt consists of mafic volcanic rocks of the Dogtooth Group. To the south of Gibi and Andy lakes, the Dogtooth Group mafic rocks are overlain by both the mafic volcanic and felsic members of the Gibi Lake Volcanic Group. All of the volcanic rocks were then intruded by the pegmatitic granites of the Nelly Lake Intrusion. These volcanic sequences are overlain by metasedimentary rocks, both a northern and a southern unit. A series of east to northeast-trending mafic intrusive sill like bodies were injected subparallel to parallel to the regional foliation. This entire package was later intruded by the Dryberry batholith to the north and east. All of the Archean units were later intruded by a series of northwest-trending diabase dikes of Proterozoic Age.

The Hulda occurrence consists of two trenches hosted in a sheared, gabbroic rock. Trench 1 contains a 0.7m wide vein of quartz, which averages trace-5% chalcopyrite-pyrite with malachite staining (Sample 745747) in a highly sheared, carbonatised gabbro (Sample 745748). A second, twenty centimeter wide, quartz vein with high grade copper mineralization occurs on the western side of trench 1 (Sample 745749). Trench 2 is located 30 m north of Trench 1. Trench 2 consists of a weakly sheared, medium grained gabbro with rusty patches of finely disseminated trace-2% pyrite-chalcopyrite (Sample 745750). Assays up to 4.0% Cu have been reported from Trench 1 (Kenora Assessment Files 52F/09SW EE-1).

One hundred meters southeast of Trench 1, a gabbro to ultramafic intrusion was observed. This is a fine-grained, dark green to black, weakly carbonatized, massive to weakly foliated, chloritic rock of gabbroic or ultramafic composition. This unit has been hydrothermally altered as shown by the grain size reduction, pervasive carbonate introduction and chloritic alteration. This may represent the southern extent of the same mafic unit that hosts trench one and two.

It will prove difficult to accumulate any tonnage for mining purposes based only on the narrrow quartz-chalcopyrite veins. However, their presence could signify the presence of a larger reservoir of copper mineralization. One possible source is the gabbroic intrusive rocks with high Cu and Cr values. All the mineralized samples seen by the author were altered, possibly enriched or depleted in metals values. Samples of unaltered gabbro taken by Etherington show no elevated metal values (Kenora Assessment Files 52F/09SW EE-1). This may eliminate the gabbro to ultramafic rocks as a possible source of the copper mineralization. Another possible source for the copper mineralization is the Dogtooth Lake Mafic Volcanic Group or Gibi Lake Mafic-Felsic Volcanic Group. The Dogtooth volcanic rocks are known to host four Cu-Zn showings and the Gibi Lake volcanic rocks are known to host eight Cu-Zn-Au showings. All of these showings are thought to be volcanogenic massive sulfides in origin (Rivett and MacTavish, 1980).

Table 8. Selected assay results of grab samples from the Etherington-Thompson Property.

Sample	Rock Type	Ba ppm	Cr ppm	Cu ppm	Ga ppm	Mo ppm	Ni ppm	Pb ppm	Sb ppm	Sn ppm	W ppm	Zn ppm
745746	Aplite Dike + 2-3% Py	61	45	32	11	N.D.	N.D.	3	N.D.	1	2	11
745747	Quartz Vein + Malc +Py	7	99	>1000	N.D.	11	47	1	N.D.	1	0	23
745748	Carbonatised Gabbro	N.D.	>500	43	7	N.D.	491	1	N.D.	0	0	47
745749	Qtz Vein + 8-10% Cpy	18	152	>1000	1	4	266	2	N.D.	4	0	162
745750	Medium Gabbro	101	>500	>1000	12	4	118	1	N.D.	1	0	45
745751	Altered Gabbro	10	>500	147	4	N.D.	901	8	N.D.	6	0	37
745752	Rusty Quartz Vein	71	54	256	1	1	49	1	N.D.	0	0	11

N.D. not detected
Results that exceed detection limits will be re-analyzed.

Gullwing Lake Pegmatite, Webb Township (C. Ravnaas)

Dryden prospectors Alex Glatz and Mike Woitowicz hold one unpatent claim in Webb Township. This claim was staked to cover the Gullwing Lake pegmatite and numerous other pegmatite intrusions. The property was acquired to evaluate the potential for cesium (Cs), lithium (Li), rubidium (Rb), and tantalum (Ta). The property, located 25 km northeast of the City of Dryden, is accessible via the Ghost Lake Road which connects to Highway 17 near the Dryden Airport.

Table 9. Previous exploration conducted on the Gullwing Lake Pegmatite.

Year	Company / Individual	Exploration Activity	Kenora Assessment File	
1960	Kozowy, A.	Pr		
1970	Canadian Nickel Co. Ltd	DD 1-99 m	52F/15 NE 11 A-1	
1981	Selco Inc.	DD 1-37 m, GL, Lc, Samp	52F/15 NE 14 A-1, 16 A-1	
1997	Woitowicz, M.	Str, Pr, Samp	52F/15 NE 26	OPAP 97-97
1997	Glatz, A. & Woitowicz, M.	GM, VLFEM, Str, Samp	52F/15 NE 24, 25	OPAP 97-88
1998	Glatz, A. & Woitowicz, M.	PR, Str, Tr, Samp	52F/15 NE 27	OPAP 98-42
1999	Glatz, A. & Woitowicz, M.	DD 2-130m, GL, Samp	52F/15 NE 33	OPAP 99-79

Page (1984) has adequately described the geology of the area. The Gullwing Lake pegmatite has received detailed examination by Breaks (1989) as part of a Ph.D. thesis compilation. The property is situated within the Wabigoon Subprovince, proximal to the boundary with the English River Subprovince. Rare metal bearing granitic pegmatite intrude the supracrustal rocks which consist of mafic metavolcanic flows, intermediate pyroclastic and clastic sedimentary rocks (Kenora Assessment Files, 52F/15NE 16A-1). The mafic metavolcanic rocks host the rare metal pegmatite intrusions.

The Gullwing pegmatite is 421 m long, curvilinear, trending 160°, with a varying 24-46 m width with dips of 30-70° east and 60-75° west. The outcrops of pegmatite are well exposed along the south shore of Gullwing Lake with moderate to high relief.

The Gullwing Lake pegmatite has been divided into three zones, North, Central and South, based upon the increase in grain size and differing mineral assemblages (Breaks, 1989). Examination of the zones for rare metal mineral concentration has been the target of previous exploration by the property owners. The South Zone is identified by an increase in pegmatite crystal size of the potassic feldspar, quartz, muscovite. Crystal size can be 1-3 m in diameter. The Central Zone is identified by the appearance of spodumene and increase in columbite in topographically lower areas. The North Zone shows an appearance of lithian muscovite – platy albite replacement mineralization (Breaks, 1989).

A 1999 diamond drill program conducted by the property owners tested the rare metal potential of the South Zone. Both drill holes intersected pegmatite units consisting of blocky, 1-3 m size, quartz and potassic feldspar grains rimmed by bands of muscovite. Results of drill core analysis returned anomalous Rb values ranging up to 3400 ppm with low Li, Cs, Ta. Of particular interest near the bottom of drill hole W2, an eight meter wide zone of disseminated native copper and sphalerite hosted in quartz, was intersected (Kenora Assessment Files, 52F/15NE 33).

Table 10. Selected assay results of grab samples from the Gullwing Lake Pegmatite.

Sample	Rock Type	Zone	Cs ppm	Li ppm	Rb ppm	Ta ppm	GPS Location
427	Quartz, microcline, muscovite pegmatite	Central	98	510	>400	59	5529117 N 532808 E
428	Quartz, microcline, muscovite pegmatite	Central	184	48	>400	2	5529117 N 532808 E
429	Quartz, microcline, muscovite pegmatite	Central	131	653	>400	35	5529117 N 532808 E
430	Quartz, microcline, muscovite pegmatite, lepidolite observed at the contact of quartz and feldspar crystals	North	>250	>2000	>400	>350	5529250 N 532797 E

Results that exceed the detection limits will be re-analyzed.

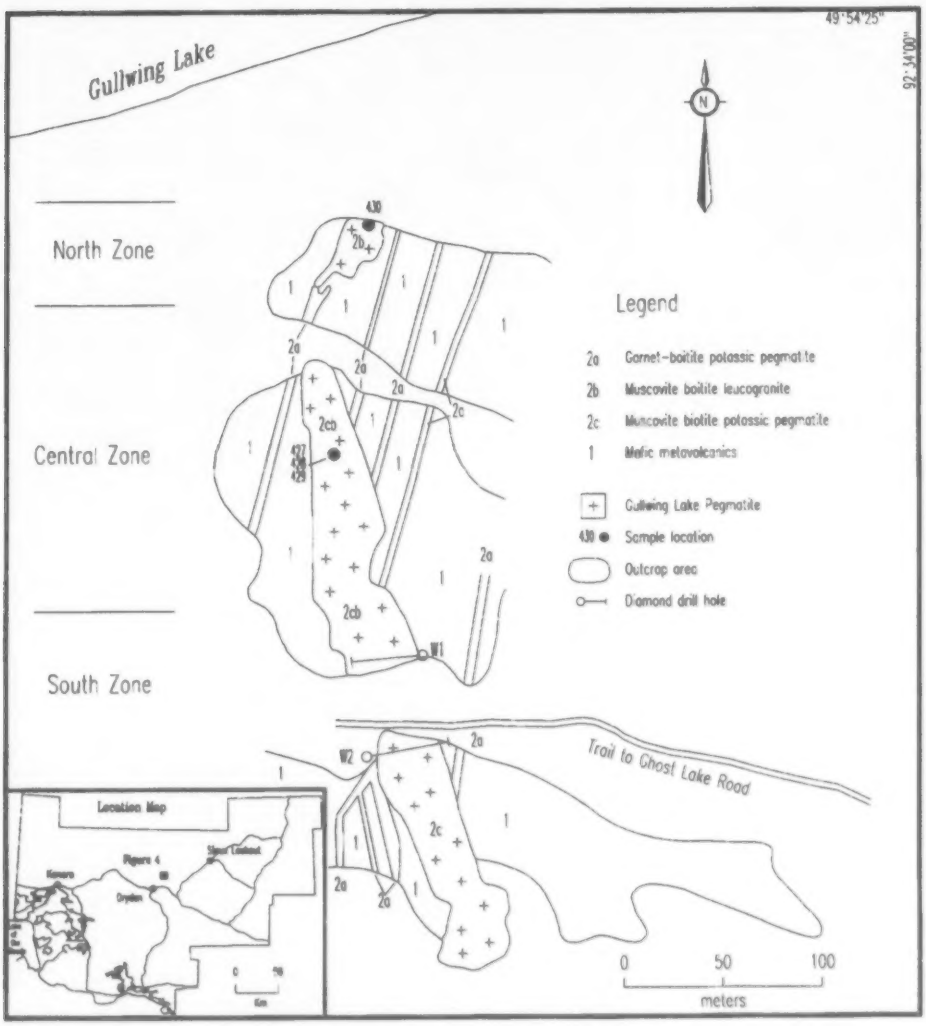

Figure 4. Geology and sample locations of the Gullwing Lake Pegmatite (modified after Breaks, 1989).

Islets Lake Stock Examination, Highway 622 (A. Raoul)

During the summer of 2000, a reconnaissance mapping and sampling program of the Islets Lake stock was conducted. The objective of this program was to evaluate the potential of the area to host base metal and platinum group element (PGE) mineralization, similar to the Entwine Lake intrusion.

Highway 622 traverses the area from the north to south and provided access to good - outcrop exposure. The area is located 45 km southeast of the Town of Ignace, Ontario (52F/08SE and 52F/01NE). The Islets Lake stock, Wabigoon Subprovince has not been geologically mapped in detail nor adequately explored for Ni-Cu-PGE mineralization.

McWilliams (1998) described the general geology; "The Islets Lake stock is composed of medium to coarse grained, massive to weakly foliated biotite hornblende syenodiorite and diorite, which appear very similar to the rocks of the Entwine Lake stock. The presence of amphibolite xenoliths and rafts suggest that like the Entwine Lake Stock, it intruded former metavolcanic rock assemblages which now have been removed by erosion."

Thirty-four samples were collected for analysis during this study. The lithology of the area shall be discussed in a south to north direction. Figure 5 illustrates the geology, sample locations and zonation of the stock, Table 11 presents the major element geochemistry of selected samples.

Foliated, pillow basalts were located, south of the stock, near Islets Lake. This unit (1) has been metamorphosed to amphibolite displaying relict pillow selvages of epidote.

Unit 3a is 150-200 m of highly foliated to migmatized, quartz diorite, which is composed of a fine-grained, recrystallized aggregate of hornblende-plagioclase-quartz with several anatexic dikes of quartz-orthoclase. The identification of 7-10% visible quartz in the sample indicates a possible felsic to intermediate intrusive origin.

Unit 3b is 300 m of medium-grained, massive, quartz diorite, which is composed of 30-35% hornblende-biotite, 55-60% plagioclase with 8-10% quartz. Small, randomly oriented, dikes of orthoclase with minor plagioclase-quartz-biotite are present.

Unit 3c is 4500 m of medium-grained, massive, diorite, which is composed of 33-50% hornblende +/- biotite, 40-45% plagioclase, trace-2% quartz with minor quartz-orthoclase dikes or pods. A 1500 m wide sub-unit (3d) was identified by potassium-sodium alteration within unit 3c. This alteration is composed of 5-25 % replacement by medium to coarse grained, orthoclase-albite. Numerous veins and pods of orthoclase-albite +/- quartz are present. The major element geochemistry of this sub-unit indicates high (9-10% combined) potassium and sodium values. This possibly represents an albitization and orthoclase introduction from hydrothermal fluid alteration.

North of units 3c and 3d, a repetition of the southern units was observed.

Northern unit 3b is 4000 m of medium-grained, massive, quartz diorite, which is composed of 30-35% hornblende-biotite, 55-60% plagioclase with 8-10% quartz. This unit is similar in mineralogy and major element geochemistry to the southern quartz diorite, unit 3b. Randomly oriented, dikes of orthoclase-plagioclase with minor quartz-biotite are present. At the north contact, unit 3d is a 30-40 m wide zone of potassium-sodium alteration, comprised of 5-25 % replacement by medium to coarse grained, orthoclase-albite. Numerous veins and pods of orthocalse-albite +/- quartz are present.

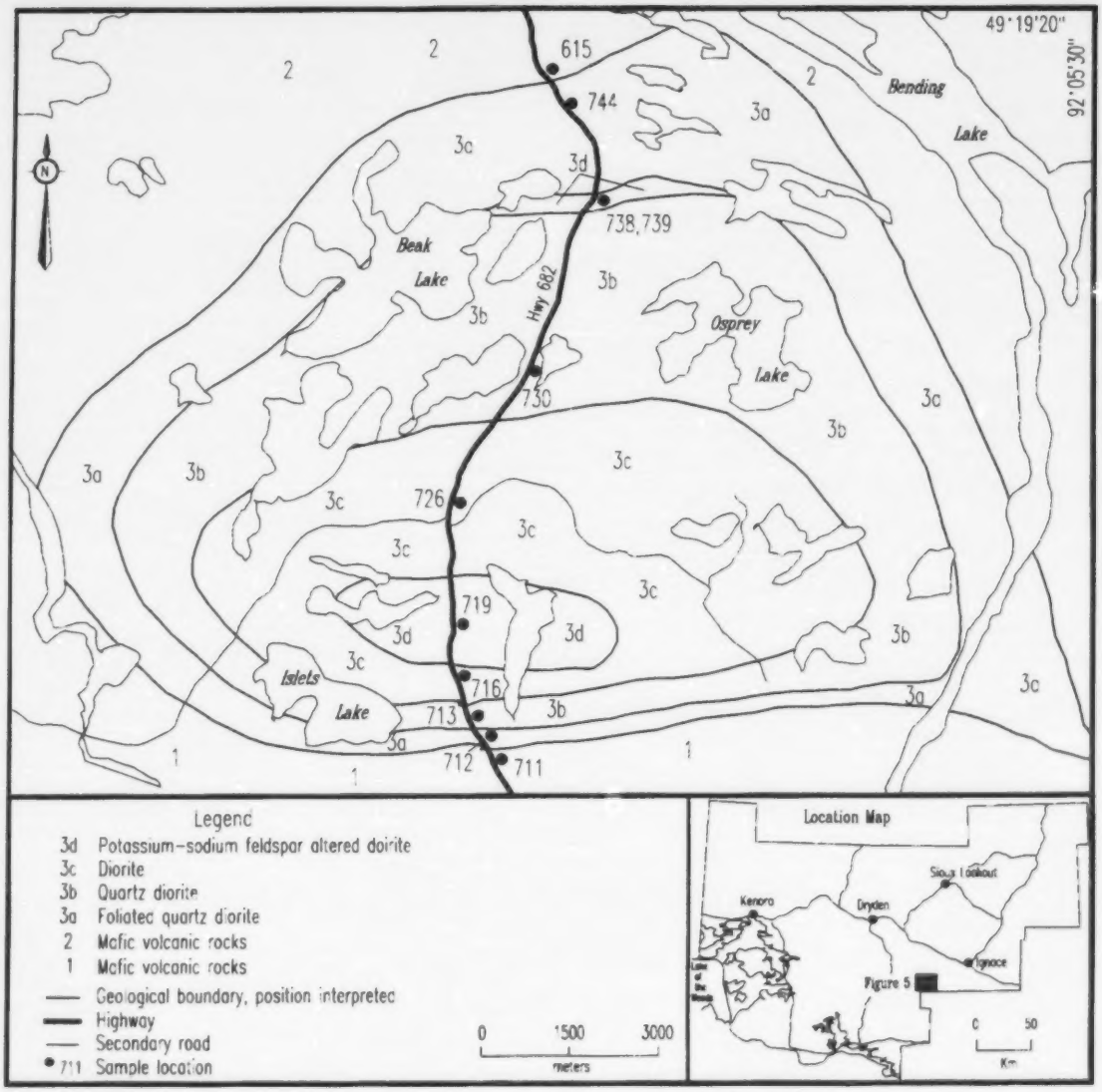

Figure 5. Geology and sample locations of Islets Lake Stock (modified after Blackburn, 1978).

Northern unit 3a is 2000 m of fine to medium-grained, moderately to strongly foliated, quartz diorite, which is composed of 30-35% hornblende-biotite, 45-50% plagioclase and 10-15% quartz. An increased biotite and decreasing hornblende percentage was observed in the north half of the unit. This northern unit 3a has similar major element geochemistry as the southern unit 3a, the foliated to migmatized quartz diorite. Due to the different metamorphic grades of these units, a field comparison is difficult.

North of the Islets Lake stock, unit 2 is a fine-grained, weakly chloritic, massive to pillowed, mafic volcanic flow units. The large variations in major element geochemistry, especially the SiO_2, MgO, CaO, K_2O, identify a different genesis of formation between units 1 and 2. Unit 1 basalt is typical of a primitive ocean floor basalt and unit 2 basalt is typical of an evolved, calc-alkaline basalt.

Table 11. Major element geochemistry of selected samples from the Islets Lake Stock.

Sample	Rock Type	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	MgO %	CaO %	Na_2O %	K_2O %	MnO %	P_2O_5 %	TiO_2 %	LOI %
711	Basalt	61.49	16.50	8.91	2.39	1.53	3.03	2.78	0.20	0.18	0.82	2.20
712	Foliated Qtz Diorite	57.50	15.32	7.23	4.96	6.37	4.59	1.68	0.12	0.24	0.82	1.02
713	Qtz Diorite	61.86	16.38	4.92	2.94	5.15	4.91	2.22	0.08	0.23	0.53	0.52
716	Diorite	57.22	14.66	6.89	5.47	6.88	3.59	2.95	0.14	0.28	0.56	0.69
719	K Altered Diorite	55.58	16.64	6.93	4.44	5.56	4.28	3.61	0.11	0.47	0.79	1.18
722	K Altered Diorite	55.74	16.80	7.01	4.42	5.47	4.31	3.79	0.11	0.41	0.70	0.72
726	Diorite	55.72	16.68	7.24	4.05	5.63	4.53	3.74	0.12	0.40	0.72	0.68
730	Qtz Diorite	55.30	16.46	6.60	4.56	6.70	4.70	3.60	0.11	0.47	0.59	0.30
738	K Altered Diorite	59.05	16.16	5.31	3.14	4.69	4.95	4.43	0.08	0.37	0.57	0.55
739	K Altered Qtz Diorite	59.12	16.26	5.23	2.81	4.45	5.07	5.03	0.09	0.34	0.62	0.35
744	Foliated Qtz Diorite	62.70	17.90	3.97	2.65	3.68	4.19	3.12	0.06	0.16	0.50	0.71
615	Basalt	46.59	15.97	14.89	6.91	11.78	1.99	0.28	0.22	0.08	1.08	0.75

McAree Township Lamprophyre Dikes (C. Ravnaas)

The author and A. Raoul examined exposures of lamprophyre dikes in the northwest corner of McAree Township. The dikes outcrop west of Highway 72 and north of the Lake of the Camp Road, approximately 40 km south of the Town of Sioux Lookout.

The geology of the area has been adequately described by Berger (1989,1990). There has been no documented exploration work conducted on these lamprophyre dikes.

The area is underlain by Archean rocks of the Wabigoon Subprovince. The lamprophyre dikes intrude the Minnnitaki Group metasedimentary rocks and the Neepawa Group felsic metavolcanic rocks. The northeast trending lamprophyre dikes were traced in outcrop exposures for a distance of 2 km (Berger, 1989). During the property visit approximately 1100 m of strike length of the dikes could be traced.

The most characteristic feature of the lamprophyre dikes are the presence of 5 to 15 percent inclusions of granitic, metasedimentary and mafic xenoliths. Leucocratic, biotite-bearing rounded to angular granitoid inclusion are the most abundant xenoliths. Mafic xenoliths composed predominately of hornblende are next most abundant. Xenoliths of wacke, in places exhibiting bedding are the least abundant (Berger, 1989).

The location of samples collected during the area examination are shown in Figure 6. Whole rock geochemistry of the samples are presented in Table 12.

Two exposures of the lamprophyre dikes were examined. An outcrop in a gully north of the Lake of the Camp Road provided the best exposure of the dikes. The dike had a width of 2 m, and contained elongated xenoliths of granitoid, mafic and greywacke composition up to 50 cm long and 30 cm wide. To the northeast the dike narrows to 1 m in width. The lamprophyre dike was traced continuously for 420 m along a northeast trend before becoming obscured by overburden.

The second lamprophyre dike is exposed on a hilltop, 400 m northeast of the first dike, and was traced along a northeast trend for 250 m. This dike varies in width from 0.5 m to1.5 m, it contains elongated xenoliths, up to 8 cm wide by 20 cm long of predominately granitic and greywacke composition.

Both lampropyhyre dikes strike 55° with a vertical dip. The adjacent metasedimentary rocks strike 80° with a near vertical dip. Berger (1989) interpreted the exposures of lamprophyre dikes as trending along or near the axis of a synclinal fold. Berger (1990) indicates a possible southwest extension of the two lamprophyre dikes examined by the author. Investigations of this exposure are planned for the coming field season.

Mitchell (1993) states: "Rocks may be considered to be members of the lamproite clan if they are typically ultrapotassic ($K_2O/Na_2O>3$), peralkaline ($K_2O+Na_2O)/Al_2O_3>1.0$), and rich in Ba (typically >2000 ppm), Zr (>500 ppm), Sr (>1000 ppm), La (>200 ppm and F (0.2-0.8 wt. %)."

The barite values returned greater than 3000 ppm and three of the four samples collected meet the ultrapotassic requirements. The samples do not meet the peralkaline requirements. The samples shall be re-analysed for Zr, Sr, La and F to assist in the classification of the lamprophyre dikes as member of the lamproite clan.

Table 12. Major element geochemistry of samples from the McAree Township lamprophyre dikes.

Sample	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	MgO %	CaO %	Na_2O %	K_2O %	MnO %	P_2O_5 %	TiO_2 %	LOI %	GPS Location
432	50.33	11.37	7.35	0.71	11.13	1.02	3.50	0.15	1.72	0.76	1.87	543090 E 5522105 N
433	52.47	12.46	6.28	7.94	9.31	1.43	4.99	0.13	1.48	0.66	1.50	543090 E 5522105 N
434	48.69	10.83	7.69	10.78	11.82	0.87	3.15	0.14	2.08	0.78	1.73	543131 E 5521130 N
435	48.25	11.89	7.16	9.83	12.37	0.87	3.46	0.13	1.80	0.79	1.60	542536 E 5521673 N
436	50.42	11.15	6.70	9.63	11.70	1.46	3.23	0.13	1.76	0.72	1.56	542485 E 5521546 N

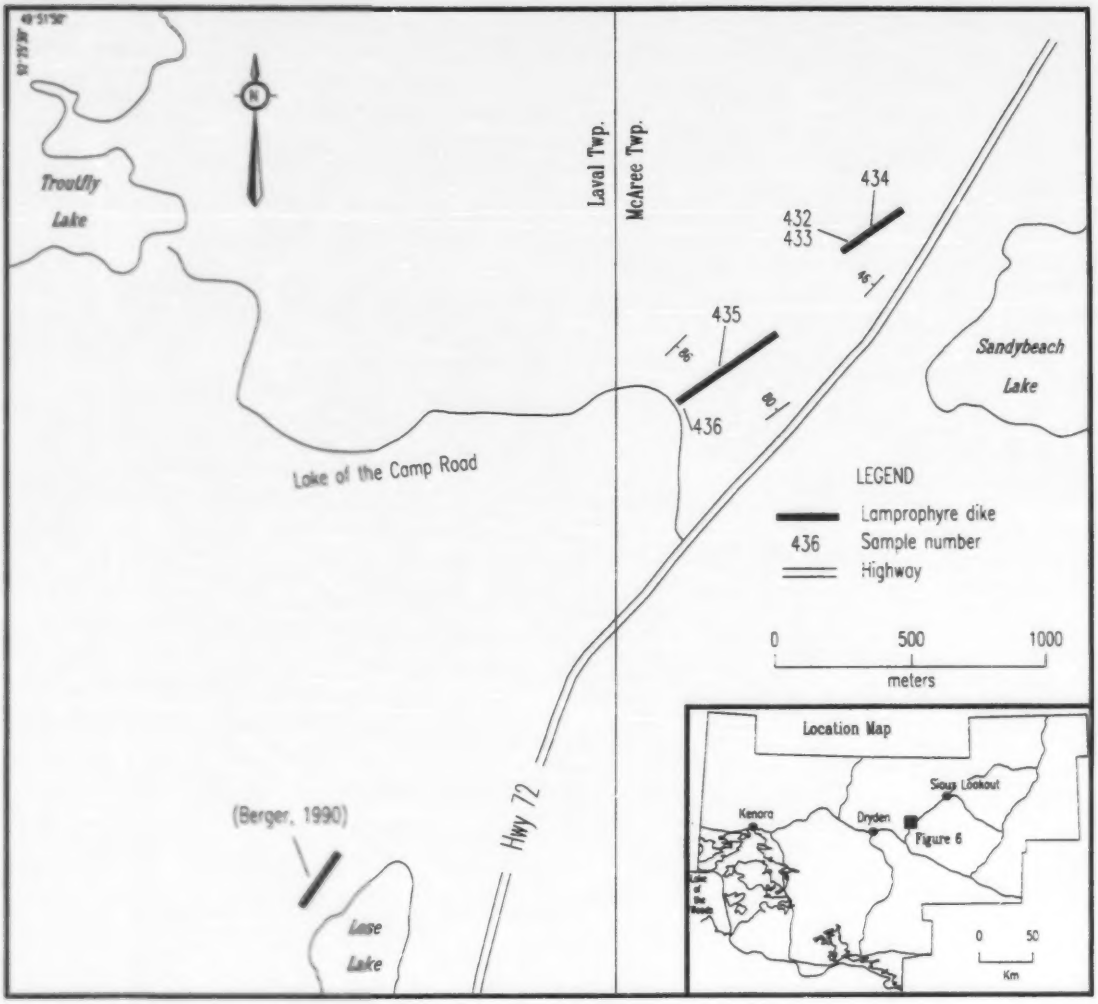

Figure 6. Geology and sample locations of the McAree Township lamprophyre dikes (modified after Berger, 1989,1990).

Mile Lake Property, Contact Bay Area (A. Raoul)

S. Johnson staked two claims over an area known as the Harrison Showing. The main exploration targets are platinum group elements and base metals. The Mile Lake Property is located 10 km south of Dryden, Ontario (52F/10NW). The property can be accessed by boat via Wabigoon Lake to Mile Lake.

In 1941, mapping by J. Satterly produced Map No. 50e of the Dryden-Wabigoon Area (Satterly, 1941). The oldest rocks on the Mile Lake property are basic to intermediate volcanic rocks of the Keewatin Group. They are overlain by acid volcanic rocks of the Keewatin Group. These volcanic rocks have been intruded by the Haileyburian norites on the north, east and south sides of Mile Lake. These volcanic and intrusive rocks were then intruded by the Algoman diorite to quartz diorites (Satterly, 1941). All of the younger formations were then intruded by late, northwest trending, Keweenawan quartz diabase dikes.

In 1971, J. Harrison and H. Hanson of Eagle River discovered nickel mineralization. Chalcopyrite and pyrrhotite were found in six locations near the south shore of Mile Lake. The sulphides were found along small shears and fractures and to a lesser extent, disseminated throughout the gabbroic unit (Gibson, 1972). A 1971 property visit by H. L. King, Kenora Resident Geologist, located six pits of mostly gabbro with weakly disseminated pyrite-pyrrhotite or felsite dikes with trace chalcopyrite-pyrite (Kenora Assessment Files 52F/10NW W-4).

In 1973, Nicro Mines drilled 32 holes in the Mile Lake-Contact Bay Area. Holes 2 and 5 intersected a medium grey gabbro with pyrrhotite-pyrite-chalcopyrite mineralization. An interval from 72-84 feet in hole 5 assayed 0.55% Cu, 0.45% Ni, and 0.248 ounce per ton PGE. These holes are stored in the Kenora Drill Core Library (Kenora Assessment Files 52F/10NW W-1).

The Dryden Airborne Electromagnetic and Magnetic Survey (Ontario Geological Survey, 1987) covers the entire area. A large magnetic high, with coincident EM conductors associated with an oval, ultramafic intrusion on the east side of Mile Lake.

In 2000, S. Johnson and the author re-sampled the 1973 Nicro Mines diamond drill core in the Kenora Drill Core Library. The anomalous Au-Pt-Pd results reported in hole 5 could not be repeated. Results of drill core sampling, presented in Table 16, show elevated Au-Pt-Pd-Cu-Ni. It was later found out that the Nicro Mines assays were "punch-spot" assays. These are selective assays taken with a punch to sample the sulphide mineralization.

An inspection of the Mile Lake property located six blasted pits on a point at the south end of Mile Lake. Outcrop and pits examined during the property visit are illustrated in Figure 7. Assay results and whole rock geochemistry of samples collected are presented in Tables 13, 14 and 15.

The four western pits (A, B, C, D) were hosted by a medium grained, quartz diorite to diorite while the two eastern pits (E, F) are hosted by a fine to medium-grained gabbro. Minor, disseminated sulphides of pyrrhotite and chalcopyrite occur in both rock types. Higher quantities of sulphides were found in the altered gabbroic rocks located within north-trending fracture zones, up to 5-15% pyrrhotite and 1-3% chalcopyrite were noted

Three hundred meters east of these pits, ultramafic rocks of pyroxenite were located on a lake reef and near the south shore. These are fine grained, dark brown, pyroxene-rich rocks with minor fine olivine and fine magnetite. Along the fracture zones, the ultramafic rocks can be carbonatized and can display fine aggregates of serpentine-talc with magnetite-hematite bands along the fractures.

The whole rock geochemistry of the pit area and the south shore area are different and therefore represent two different genetic types. Samples of quartz diorite, e.g. 606, and the ultramafic rocks, e.g. 613, show large variances in most major elements (SiO_2, Al_2O_3, MgO, CaO, Na_2O, K_2O and LOI). The gabbroic rocks found in pits E and F, e.g. 609, are similar in geochemistry to the quartz diorites and represents a mafic border phase of the plutonic rocks of the Atikwa Batholith.

Table 13. Major element geochemistry of samples from the Mile Lake Property.

Sample	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	MgO %	CaO %	Na_2O %	K_2O %	MnO %	P_2O_5 %	TiO_2 %	LOI %
601	43.76	14.20	16.24	11.49	6.24	0.99	0.66	0.16	0.04	0.34	4.83
602	50.42	21.30	6.00	6.06	10.52	1.97	0.51	0.11	0.04	0.20	2.95
603	56.61	16.34	9.10	3.96	7.92	2.66	1.09	0.13	0.18	0.87	0.98
604	39.43	6.99	29.06	9.87	4.84	N.D.	1.31	0.17	0.09	0.62	7.59
605	50.96	18.57	9.97	5.26	7.53	2.43	1.11	0.19	0.24	0.85	2.25
606	46.67	19.06	9.50	6.85	12.35	1.19	0.23	0.15	0.02	0.18	2.46
607	46.14	14.47	12.85	13.31	7.41	0.74	0.15	0.17	0.01	0.23	4.21
608	32.81	17.14	27.09	4.61	8.39	N.D.	0.10	0.09	0.01	0.11	5.56
609	45.59	24.70	8.53	4.29	11.10	2.42	0.17	0.09	0.01	0.11	2.19
610	43.00	3.40	12.08	32.19	1.14	0.12	0.02	0.17	0.01	0.12	8.11
611	35.00	2.30	13.25	33.21	N.D.	0.02	N.D.	0.16	0.03	0.08	15.69
612	34.34	3.04	9.55	29.85	5.40	0.02	N.D.	1.20	N.D.	0.06	16.94
613	36.48	1.33	13.69	33.74	0.08	0.02	N.D.	0.16	0.02	0.08	14.34

N.D. not detected

Table 14. Sample descriptions and Au, Pd, Pt results of grab sample from the Mile Lake Property.

Sample	Pit	Sample Description	Au ppb	Pd ppb	Pt ppb	GPS Location
601	A	Medium grained, quartz diorite with 5% Po and trace-1% Cpy	18.01	28.86	8.00	515368 E 5502756 N
602	B	Coarse grained, quartz diorite	N.D.	N.D.	N.D.	515375 E 5502777 N
603	B	Fine grained, mafic dike	3.32	N.D.	N.D.	515373 E 5502777 N
604	B	Chloritic gabbro (altered) with 12-15% Po and 2-3% Cpy	4.71	15.59	29.49	515373 E 5502777 N
605	C	Fine grained, weakly chloritic gabbro (altered) with 3-5% Po	3.09	N.D.	1.84	515397 E 5502777 N
606	D	Medium grained , quartz diorite with trace-2% Py	23.77	2.81	10.86	515411 E 5502754 N
607	E	Medium grained, gabbro with trace Py	2.47	4.24	6.55	515457 E 5502756 N
608	E	Fine to medium grained gabbro (fractured) with 5-8% Po	66.82	81.34	11.21	515457 E 5502756 N
609	F	Fine grained gabbro with trace-2% Po and trace Cpy	14.37	N.D.	N.D.	515467 E 5502768 N
610	Reef	Ultramafic – fine grained, dark, heavy, highly magnetic rock	1.29	1.95	3.17	515813 E 5502688 N
611	South Shore	Oxidized ultramafic (Serp-Talc patches) with hematite-magnetite bands along fractures.	1.32	1.42	9.93	515886 E 5502386 N
612	South Shore	Ultramafic – fine to medium grained, brown, pyroxene rich	3.00	4.53	5.84	515886 E 5502386 N
613	South Hilltop	Ultramafic – medium grained, pyroxene-rich with olivine-mgt.	1.33	4.46	4.24	515900 E 5502356 N

N.D. not detected

Samples 604 and 608 of the mineralized, sheared or fractured, gabbroic rocks returned elevated combined Au-Pt-Pd values of 50 ppb and 160 ppb. The quartz diorites, gabbro, and ultramafic rocks show combined Au-Pt-Pd of 10, 15 and 10 ppb. The altered gabbro also hosts elevated copper-nickel mineralization greater than 2000 ppm. The ultramafic rocks returned elevated nickel values of greater than 1000 ppm but not copper or Au-Pt-Pd. This ultramafic unit cannot be the source of this elevated to anomalous Cu-Au-Pt-Pd mineralization so another possible source must be found.

Table 15. Assay results of grab samples from the Mile Lake Property.

Sample	Ag ppm	As ppm	Ba ppm	Bi ppm	Cr ppm	Cu ppm	Mo ppm	Ni ppm	Pb ppm	Sb ppm	Se ppm	Sn ppm	W ppm	Zn ppm
601	4	13	117	1	409	887	N.D.	1497	4	N.D.	6338	2	0	119
604	4	19	183	N.D.	>500	>1000	3	1494	3	N.D.	16530	3	0	114
605	4	9	176	2	153	623	2	162	44	1	1472	33	1	334
606	6	10	65	1	192	>1000	2	121	87	2	1474	70	0	172
608	17	18	32	2	85	>1000	3	1834	5	N.D.	14820	1	0	243
609	6	4	51	1	52	759	N.D.	131	5	N.D.	3360	2	0	65
610	2	10	39	0	>500	8	N.D.	1140	0	N.D.	24	0	0	66
611	3	20	43	0	>500	5	N.D.	1440	1	N.D.	135	0	0	94
612	3	20	114	0	>500	6	N.D.	1601	1	N.D.	27	0	0	44
613	3	18	14	0	>500	3	N.D.	1342	0	N.D.	473	0	0	36

N.D. not detected
Samples 602, 603, 607 were not analyzed.

Table 16. Assay results of diamond drill core sample.

Sample	Hole No Depth (ft)	Ag ppm	Au ppb	Ba ppm	Cr Ppm	Cu ppm	Mo ppm	Ni ppm	Pb ppm	Pd ppb	Pt ppb	Sn ppm	W ppm	Zn ppm
656	5 @ 12'	4	16.99	113	479	561	N.D.	276	5	37.19	20.18	1	0	123

Further exploration for sheared or fractured, gabbroic rocks along the border zones of the Atikwa batholith are recommended. The border zones are known to host Cu-Ni mineralization, can have elevated PGE values and may have potential to host significant tonnage if a large enough structure can be found to host the mineralization.

One possible source is the Atikwa batholith, located to the southwest. It has been reported to host Cu-Ni-PGE mineralization in its border phases, such as the Emmons occurrence (Hinz, 1998). The host rock of the pit area and the Atikwa batholith, to the southwest, are both of quartz diorite to diorite composition. This pit area is probably an extension of the Atikwa batholith.

It is recommended that the Mile Lake area be thoroughly explored for more mineralization. No ground geophysical work has been carried out. However, airborne electromagnetic and magnetic surveys (Ontario Geological Survey, 1987) show a large magnetic high with coincident EM conductors associated with an oval, ultramafic intrusion on the east side of Mile Lake. This magnetic high could be caused by magnetic (magnetite or ilmenite) mineralization within the ultramafic rocks and may mask any geophysical signatures of pyrrhotite and chalcopyrite. Ground geophysical surveys could eliminate this masking effect. Over the same magnetic anomaly, Nicro Mines proved that a ground induced polarization geophysical survey was an effective exploration technique over the adjacent Beaver Pond Occurrence (Kenora Assessment Files 52F/10NW W-2).

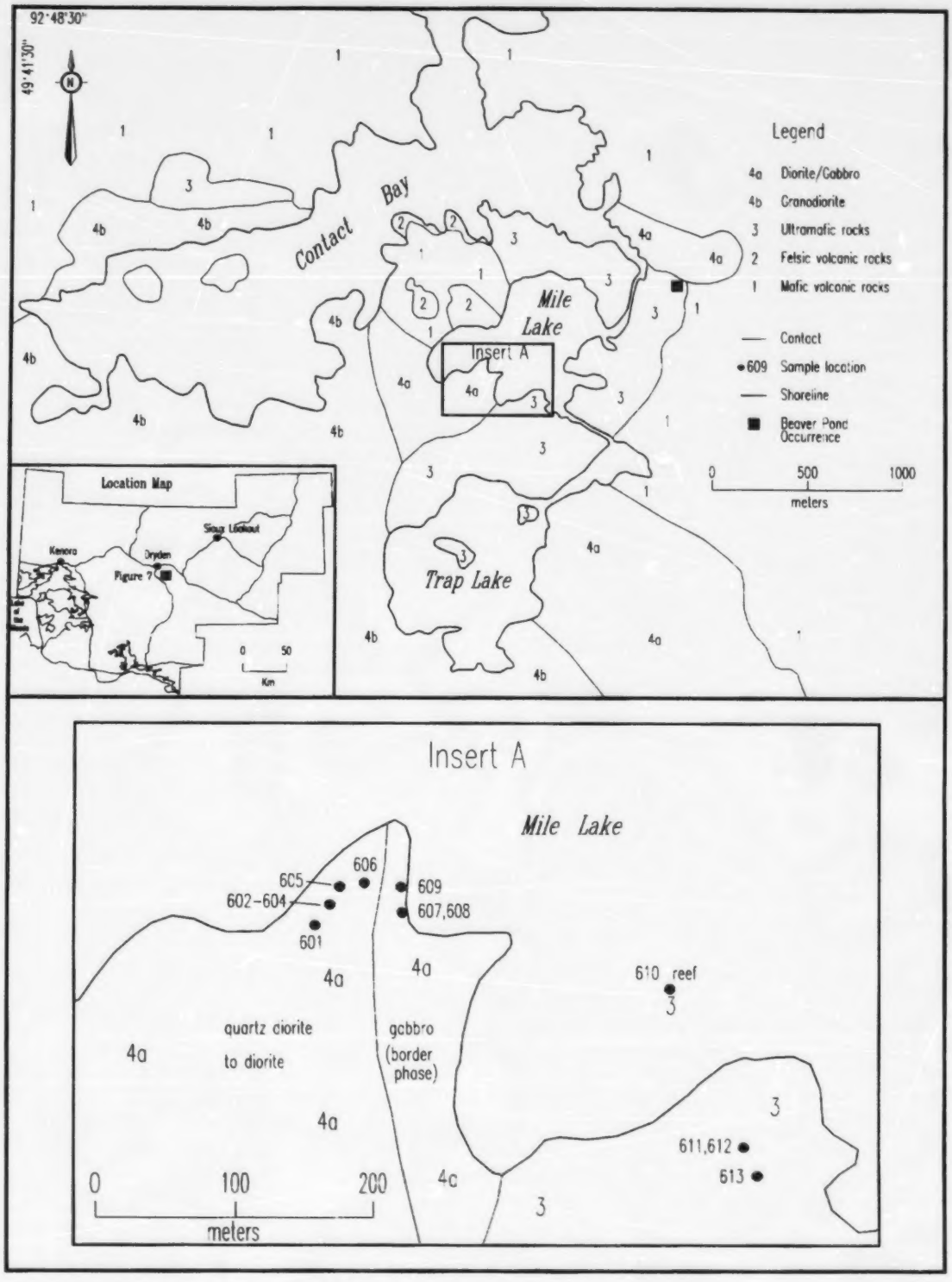

Figure 7. Geology and sample locations of the Mile Lake Property (modified after Satterly, 1941).

Mironsky Property, Halkirk Township (A. Raoul)

The Mironsky Property is located 30 km east of the Town of Fort Frances (52C/11NE). A copper occurrence is exposed on Highway 11 between supplementary roads 5134 and 5118. The property is located on mining claim 1238036, presently owned by J. Bond of Welch, West Virgina, USA, G. Clark and A. Eveleigh of Thunder Bay, Ontario.

Table 17a. Previous exploration conducted on the Mironsky Property.

Year	Company/Individual	Exploration Activity	Kenora Assessment File
1963-68	Hupchuk, Mike	Str, Tr, 3 DD–321m	52C/11NE N-1, N-2
1963	Phelps Dodge	12 DD-1114m, Mag, EM, GM	52C/11NE Z-1, Z-2
1975-76	Armstrong, George	2 DD–192 m	52C/11NE N-3
1978	Belacoma Mines	11 DD	
1979	Armstrong, George	1 DD–66 m	52C/11NE N-4
1999	Donnybrook Resources.	Staked June/99	

The rocks of Mine Centre-Fort Frances area occur within the Superior Province in a fault-bounded wedge between two subprovinces, the Wabigoon granite-greenstone terrane to the north and the Quetico metasedimentary-gneiss terrane to the south (Poulsen, 2000). The geology of the area is underlain by a dominantly mafic volcanic suite of rocks with minor felsic volcanic rocks and related metasedimentary rocks of the Rainy River Mafic Volcanic Group. Several anorthositic to gabbroic sills, such as the Bad Vermillion and Grassy Portage Sills, intrude this mafic suite. Both the mafic suite and gabbroic sills were then intruded by late granitoid intrusions, such as the Rice Bay and Ottertail Lake intrusions. This entire lithological package has been structurally controlled by the Seine River fault and Quetico fault (Harris, 1974).

The Mironsky property is underlain by rocks of the upper zone of the Grassy Portage intrusion and by metasedimentary rocks at the southern border of the intrusion. Garnetiferous quartz diorite, magnetite-apatite amphibolite, quartz-plagioclase schist and quartz gabbro form the dominant members of the Grassy Portage intrusion exposed on this property (Poulsen, 2000).

Sampling by the author identified the following lithologic sequence along Road 5134 southward to Road 5118 (*see* Figure 8, this report). The first unit consists of a fine grained, foliated, aggregate of plagioclase and minor amounts of quartz, probably a meta-anorthosite, with weakly disseminated, fine pyrite and chalcopyrite. These rocks contain high TiO_2 (1-2%), typical of anorthosites with associated magnetite-ilmenite-sphene mineralization. This unit contains a 10 m wide zone of oxidized, meta-anorthosite with 3-5% chalcopyrite and trace-1% pyrite mineralization. A second unit consists of a fine to medium grained, weakly foliated, mafic volcanic rock of basaltic composition with minor chlorite-actinolite. A 2.5 m wide, medium to coarse grained, gabbroic to ultramafic dike crosscuts this unit. At the southern boundary of this unit, a five meter wide, east trending, zone of talc schist is present, representing a carbonatized shear zone. The southernmost unit is a fine to medium grained, foliated biotite-garnet diorite with trace pyrite-pyrrhotite.

Table 17b. Major element geochemistry of samples from the Mironsky Property.

Sample	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	MgO %	CaO %	Na_2O %	K_2O %	MnO %	P_2O_5 %	TiO_2 %	LOI %
745767	65.97	12.02	7.12	1.88	3.06	5.66	0.59	0.04	1.16	1.00	1.23
745768	52.23	14.46	16.42	3.46	8.01	3.16	0.37	0.25	0.41	2.04	0.40
745769	47.45	14.46	8.93	10.99	6.45	3.77	2.37	0.08	0.95	0.88	2.57
745770	49.73	13.88	19.71	3.61	6.59	1.75	0.61	0.60	0.43	2.18	1.33
745771	59.60	11.76	4.65	12.40	3.63	2.90	0.09	0.04	0.10	1.32	3.67
745772	65.61	12.40	5.46	2.19	1.21	4.27	1.03	0.05	0.30	1.13	1.86
745773	65.06	11.59	6.07	1.03	1.45	3.31	0.61	0.03	0.26	1.00	2.21

The mineralized zone, represented by samples 745772 and 745773, is exposed at surface as a 10 m wide zone of weakly to moderately oxidized meta-anorthosite or plagioclase schist. This zone contains 3-5% chalcopyrite and trace to 1% pyrite mineralization. Anomalous Cu values greater than 1000 ppm have been located along with elevated Au 160-200 ppb and Mo 48-56 ppm.

Table 18. Assay results of grab samples from the Mironsky Property.

Sample	Au ppb	Cu Ppm	Ni ppm	Pd ppb	Pt ppb	Ag ppm	Ba ppm	Cr ppm	Mo ppm	Pb ppm	Sn ppm	W ppm	Zn ppm
745767	N.D.	93	18	N.D.	ND	2	96	8	N.D.	3	1	0	177
745768	N.D.	51	34	N.D.	N.D.	3	101	10	N.D.	3	1	0	127
745769	9	>1000	963	46.52	N.D.	2	440	350	N.D.	6	1	0	66
745770	N.D.	86	30	N.D.	N.D.	2	137	9	N.D.	5	1	1	360
745771	6	514	80	N.D.	N.D.	5	15	6	N.D.	2	2	0	43
745772	202	>1000	36	N.D.	N.D.	9	105	N.D.	56	3	8	1	169
475773	169	>1000	39	N.D.	N.D.	2	80	N.D.	48	5	14	1	238

N.D. not detected
Results that exceed the detection limit will be re-analyzed.

Poulsen (2000) described the mineralization; "the mineralized lens of sulphide-bearing schist has been outlined by diamond drilling for a strike length of 250 m with an average thickness of 10 m. Harris (1974) estimated a reserve of 300 000 tons grading 0.8% Cu to a depth of 100 m over a strike length of 130 m, based on 1963 drilling. Recent drilling has confirmed the grade and extended the strike length of the zone. Diamond drill hole B-3 encountered 11 m of 1.23% Cu (Kenora Assessment Files). As the zone dips 45° northwestward, this effectively represents a true width".

The Mironsky Property has significant potential for copper mineralization and may be open along strike and to depth. From the established mineralized zone, no drilling has been carried out over 200 m along strike and no drilling has gone beyond 150m in depth. These anorthosite sills could contain more mineralized pods of copper mineralization.

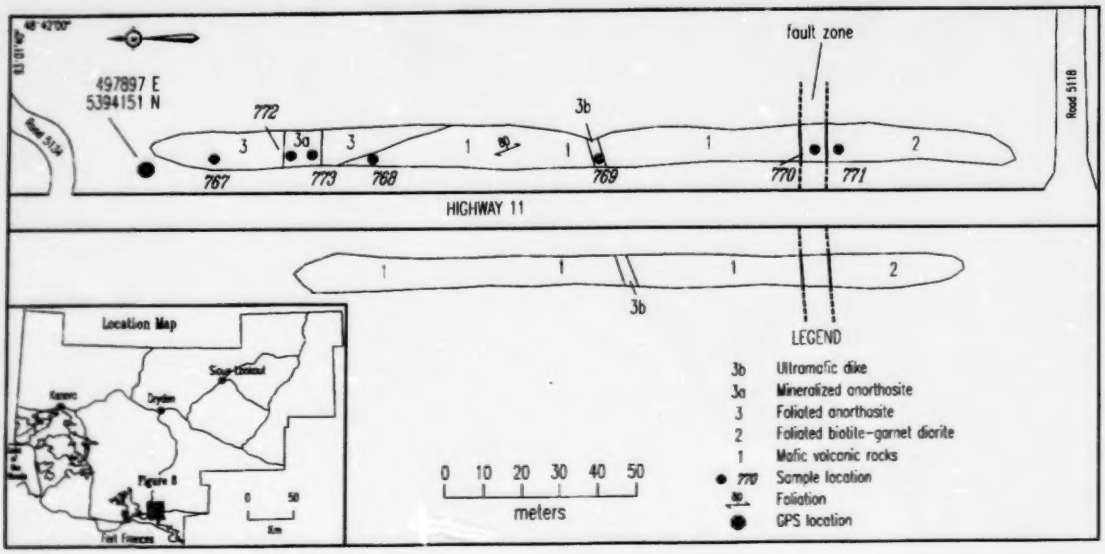

Figure 8. Geology and sample locations of the Mironsky Property.

RECOMMENDATIONS FOR EXPLORATION

Bending Lake Area

The stratigraphy of the Bending Lake area is described in Property Visits, this report. Three units (2a, 2b and 3a) show potential to host hydrothermal alteration and sulphide mineralization indicative of volcanogenic massive sulphide (VMS) deposition.

The first unit, 2a, is a thin sequence of pillowed, mafic flows with weak chlorite alteration throughout. Within small fracture zones, samples with greater than 50% chlorite-biotite replacement (e.g. sample 629) or garnet-anthophyllite replacement (e.g. sample 631), and trace to 3 % pyrite mineralization, were located. This intense alteration occurred in highly permeable rocks indicating that hydrothermal fluids did exist in the Bending Lake area and may have produced mineralization typical of VMS deposits.

The second unit, 2b, is a thick sequence of felsic volcanic rocks with weak sericite alteration. Within small fracture zones, samples (e.g. sample 628), with greater than 50% sericite-biotite-chlorite replacement and disseminated to stringer pyrite-chalcopyrite mineralization, were located. This intense alteration occurred in highly fractured rock suggesting a similar environment and genesis to unit 2a. Sample 633 is a sericitized rhyolite depleted in MgO, CaO, Na_2O and enriched in K_2O. This sample yielded a moderate ore score of 11, representative of hydrothermal alteration typical of the periphery of VMS stockwork zones.

The third unit, 3a, is a 52 m wide sequence of oxide and sulphide facies iron formation. Sample 650 is massive pyrrhotite with clasts of 10-15% recrystallized chert breccia. This sample yielded a low to moderate ore score of 8. This iron formation is typical of distal type, exhalative mineralization associated with VMS deposition.

These 3 units should be explored for their VMS potential. All display hydrothermal alteration or sulphide mineralization associated with VMS environments. Other units in the area rated low in the ore scoring system but should be considered for VMS potential. Factors that could effect this scoring system are:

A) Significant mass gain, such as silicification or sulphide introduction, would affect the percentage of other major elements as a whole. A reduction of indicator elements (such as sodium or calcium) would result in giving a false image of element depletion associated with hydrothermal alteration.
B) Mass gain, such as albitization or carbonatization, would increase sodium or calcium values and mask any previous sodium or calcium depletion.
C) The sampling methodology of taking selective grab sample could bias results. Chip samples should be taken over mineralized zones for more accurate values.

Table 19. Description of selected samples from the Bending Lake area.

Sample	Sample Description	GPS Location
627	Biotite-Chlorite Altered Felsic Volcanic with 2-3% chalcopyrite stringers.	0556739E, 5464084N
628	Chlorite-Biotite Altered Felsic Volcanic with 3-5% pyrrhotite-chalcopyrite.	0556741E, 5464092N
629	Garnet Altered Basalts with less than 5% biotite bands.	0556741E, 5464093N
631	Altered Andesite/Basalt with 1' wide fracture of greater than >80% anthophyllite and 5-7% garnet with minor chlorite-pyrite.	0556739E, 5464108N
633	Sericite Altered Rhyolite within a 6m wide bleach zone occurs (hydrothermal fluids?).	0556700E, 5464710N
650	Massive Pyrrhotite with trace-2% chalcopyrite with 10-15% clasts 10-15% of recrystallized chert breccia.	0556521E, 5466121N

Islets Lake Stock

The Islets Lake stock is composed of a central core of diorite surrounded by a unit of quartz diorite. The interpreted area of the Islets Lake stock is 145 km^2. Alteration associated with hydrothermal fluid activity was observed in the potassium-sodium feldspar altered diorite in two areas. The first area, unit south 3d, a 1500 m wide unit of potassium-sodium alteration that consists of 5-25 % replacement by medium to coarse grained, orthoclase-albite in the rock matrix and as pods. This south unit has an estimated area of 6 km^2. The second area, unit north 3d is a 30-40 m wide unit of similar alteration (*see* Figure 5, this report). This north unit is only 40 m wide and extends in an east – west strike direction for 4.5 km. The major element geochemistry of these two areas demonstrates high (combined 9-10%) potassium and sodium values, (*see* Table 11, this report). This geochemical signature represents an introduction of albite and orthoclase from hydrothermal fluid alteration as concluded from field observations. These fluids may also contain Cu-Ni-PGE mineralization and should be investigated further.

McWilliams (1998) described rocks of the Islets Lake stock as similar to the rocks of the Entwine Lake intrusion. Exploration activity by Champion Bear Resources Ltd. on the Campbell zone (*see* Exploration Activity, this report) has located the presence of Pt-Pd-Cu-Ni-Au mineralization in the Entwine Lake intrusion. Examination of the outcrops and geochemical analysis of samples from the Islets lake stock did not locate sulphide mineralization. A 30 m wide outcrop exposure along the length of Highway 622 was the only area examined. Prospecting and lithogeochemical sampling of the stock should target similar structures, lithological units and mineralization as previous programs conducted in the Entwine Lake intrusion. Operation Treasure Hunt has completed an airborne geophysical survey over the northern and eastern sections of the stock that will aid future exploration projects (*see* OGS Activities and Research by Others, this report).

Platinum Group Element Targets Areas in the Kenora District

Platinum group element (PGE) and copper-nickel occurrences are known to occur within ultramafic, mafic and intermediate intrusive rocks in the Kenora District. Previous exploration has targeted the copper-nickel mineralization. A limited number of projects have targeted the PGE mineralization. Except for significant exploration projects at the Entwine Lake Intrusion and the Rex-Werner Lake, all other PGE exploration projects have involved prospecting and sampling. Several known PGE, copper-nickel occurrences are being evaluated while areas with PGE mineralization remain open for staking, and have yet to be evaluated for PGE and copper-nickel potential.

Table 20 provides a general description of the geology and mineralization of the major ultramafic, mafic and intermediate intrusive bodies in the Kenora District. The reserve column indicates the most significant PGE-copper-nickel mineralization associated with the bodies. Figure 9, keyed to Table 20 provides a location of intrusions.

Table 20. Ultramafic, mafic and intermediate intrusions in the Kenora District.

No	AREA / NTS	COMPANY/ STATUS	GEOLOGY / MINERALIZATION	RESERVES / REFERENCES
1	Dobie Intrusion 52C/12 NW	Open ground	A norite - gabbro intrusion with po, py, pent, cpy mineralization. Sulphides are present in pockets or disseminations.	Young Option, 5 mT @ 0.28% Cu and 0.24% Ni based upon 165 DDHs (Kenora assessment files, 52C/12 NW B-3)
2	Bad Vermilion Lake Intrusion 52C/10 NE	Staked and open ground	Gabbro - anorthosite rocks in a repetitive, steeply south dipping, layered intrusion.	Several copper horizons in anorthosite were located, the grade unstated. (Poulson, 2000)
3	Grassy Portage Intrusion 52C/11 NW / NE	Staked and open ground	Gabbro - anorthosite rocks in a steeply, north dipping, layered intrusion. Basal segregation of cpy, po and pent noted.	North Rock Mine - 1.0mT @ 1.17% Cu Mironsky - 300 000 T @ 0.8% Cu (Poulson, 2000)
4	Bennett Lake intrusions 52C/16 SE / SW	Hexagon Gold (Ontario) Ltd. and open ground	Gabbroic rocks that form lobate intrusions of diorite to quartz diorite.	Grey Trout Road - grab sample returned 1.46% Cu, 0.18% Ni, 0.07% Co and 46 ppb Pd in altered anorthosite. (Blackburn and Hinz, 1996)
5	Entwine Lake Intrusion 52F/02 NE	Champion Bear Resources Inc. and open ground	Stone (2000) identified this intrusion as a sanukitoid suite of quartz monzonite to quartz diorite composition. Mineralization is hosted in altered diorite.	Campbell Zone has been traced for 1000m X 45m to depth of 150m. DDH ER-23 returned 1.2g/t Au-Pd-Pt, 4.8 g/t Ag, 0.5% Cu over 30m. (Press Releases Champion Bear Resources Ltd. 2000)
6	Jackfish - Weller Lakes Pluton 52F/03	Open ground	A possible sanukitoid intrusion. A porphyritic monzonite, syenite to diorite intrusive body that has received no PGE exploration. (Stern 1989)	Jackfish Lake - grab sample returned 4.8% Cu, 0.96% Co. Mineralization included Cu, Co, and Bi. (Blackburn, 1976)
7	Caliper Lake Intrusion 52F/04 SW	Open ground	Southward, steeply dipping, layered gabbroic intrusion composed of pyroxenite to quartz diorite.	5 grab samples returned 1154-2245 ppm Cr with low Cu and Ni values (<300 ppm). (District Office field work, 2000).
8	Denmark Lake intrusions 52F/05 NE	Nuinsco Resources Ltd. and open ground	Vari-textured gabbro with remobilized sulphides along north-south trending shear zones.	Nilson - Gauthier - grab samples returned 0.65% Cu and 0.48% Ni over 6m. (Davies, 1973)

No	AREA / NTS	COMPANY/ STATUS	GEOLOGY / MINERALIZATION	RESERVES / REFERENCES
9	Mafic intrusions around the Atikwa Batholith	Staked and open ground	PGE and Cu-Ni occurrences occur within ultramafic, mafic and intermediate intrusive rocks peripheral to the Atikwa batholith. These include the Empire Lake, Emmons, Harris Lake, Line Lake, Nabish, and Mile Lake, intrusions.	Emmons Lake - grab samples returned 717 ppm Pt, 1012 ppm Pd from an altered gabbro. (Hinz and Ravnaas, 1998) Kenbridge Mine - 3.2mT @ 1.1% Ni, 0.55% Cu. (Davies, 1973)
10	Mulcahy Intrusion 52F/11 SW	Staked and open ground	A layered gabbro in NW border of Atikwa Batholith. The Mulcahy Intrusions can be divided into 3 marginal zones. Chromite bands containing 2% sulphides were noted.	Mulcahy Lake - grab samples returned 2190 ppm Cu, 1350 ppm Ni (Sutcliffe and Smith, 1985)
11	Boyer Lake Intrusion 52F/07NE	Staked and open ground	Strongly zoned, gabbroic sill composed of gabbro to quartz-eye gabbro. Weak sulphide mineralization has been located at the periphery.	Massvai Mines - 0.2% Cu over 0.6 m (Occ.10-11) and high MgO (12-15%) in leucocratic zone. (Blackburn, 1981)
12	Pike Lake Intrusion 52G/14 SW / SE	Open ground	Composed of vari-textured quartz diorite to diorite. Disseminated Cu noted in trenches and DDHs. Cu has been the target of past exploration but not PGEs.	Trench samples returned 2 % Cu and 0.5% Ni (Kenora assessment files, 52G/14SE 61)
13	Barge Lake intrusions 52G/15 NW	Open ground	A number of gabbro to serpentinized peridotite intrusions with Cu mineralization. There has been no exploration targeting PGE.	
14	Handcuff Lake intrusions 52J/03 NE	Open ground	Unexplored vari-textured gabbro, anorthosite gabbro, quartz diorite intrusions.	
15	Marchington Road intrusions 52J/06 SE / SW 52J/07 SW	Open ground	Several mafic sills composed of diorite to quartz diorite rocks. These intrusions have not been explored for PGE.	Py, cpy noted in intrusive rocks (Bond, 1980)
16	Rex - Werner Lake Ultramafic rocks 52L/06 52L/07	Canmine Resources Inc. and open ground	Disseminated to massive magmatic Ni - Cu - Co - PGE mineralization associated with ultramafic - mafic lenses and pods. Cu - Co deposits are known in the area.	Rexora - 140 000 T @ 1.5% Ni, 0.7% Cu Gordon Mine - produced 1.4 mT @ 0.9% Ni, 0.5% Cu, .023 oz/T Pd Norpax - 1 mT @ 1.2% Ni, 0.5% Cu (Parker, 1998)

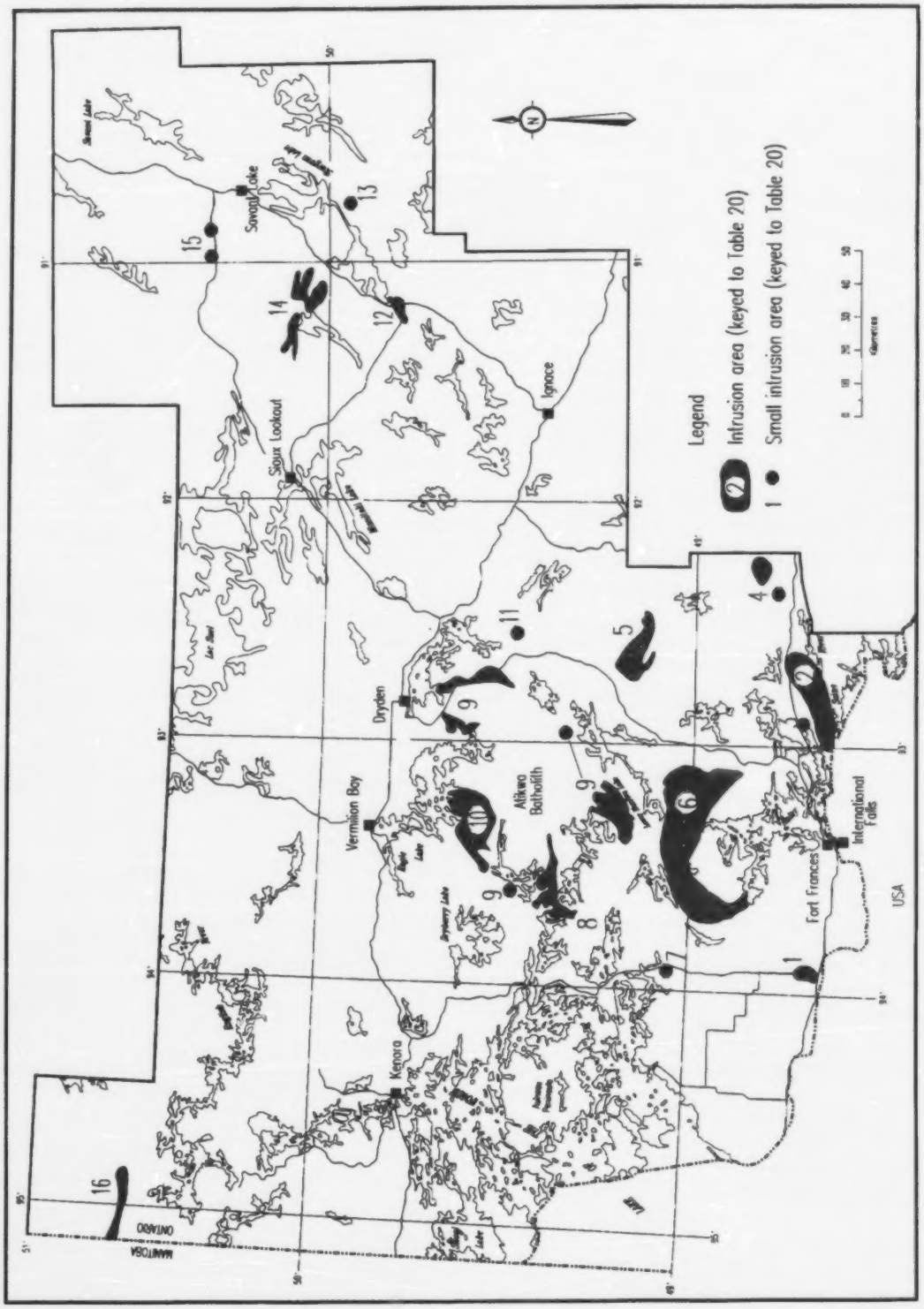

Figure 9. PGE targets in the Kenora District (modified after Blackburn, 1978).

OGS ACTIVITIES AND RESEARCH BY OTHERS

Three Ontario Geological Survey (OGS) field projects and two Operation Treasure Hunt (OTH) airborne geophysical surveys were conducted in the Kenora District in 2000. Operation Treasure Hunt started the Stormy Lake airborne geophysical surveys in the fall of 2000. The results of the surveys shall be released in 2001. For the location of the 5 projects see Figure 10.

A) The area was covered using a fixed wing aircraft mounted with the MEGATEM time domain airborne electromagnetic survey instrument. The MEGATEM has the capabilities to penetrate the glaciofluvial outwash, glaciolacustrine, glaciofluvial ice-contact, and organic deposits located in the area. A total of 18 000 km of flight lines with a 200 m spacing interval were flown.

B) The area was covered using a fixed wing aircraft mounted with the GEOTEM digital time-domain electromagnetic system. A total of 12 000 km of flight lines with a 200 m spacing interval were flown.

C) J. Arnold, G. Beakhouse and R. James, Precambrain Geoscience Section, OGS, the first year of a joint OGS / Laurentian University M.Sc. thesis project designed to map the Entwine Lake Intrusion.

D) G. Beakhouse, Precambrian Geoscience Section, OGS, the first year of a five year project on the geology of the Wabigoon to Eagle Lake area.

E) G. Beakhouse, Precambrian Geoscience Section, OGS, magnetic susceptibility: selected application to geological studies and mapping.

F) S. Smith et al., Precambrian Geoscience Section, OGS, U-Pb and $^{40}Ar/^{39}Ar$ mica age data from the rare-element pegmatite in the Separation Rapids area.

G) D. Stone and J. Halle, Precambrian Geoscience Section, OGS, a regional mapping project of the Petry River area.

Table 21. Publications received by the Kenora Office in 2000.

Title	Author	Type and Year of Publication
Pecambrian Geology of the Separation Lake Area, Northwestern Ontario	Blackburn, C.E., and Young, J.B.	OFR 6001, 94p. 2000, with OFM 241 & 242.
Report of Activities 1999, Resident Geologist Program, Red Lake – Kenora Districts	Hinz, P., Storey, C.C., Gosselin, S.D.M., Blackburn, C.C., and Kosloski, L.	OFR 6003, 66p., 2000
Report of Activities 1999, Resident Geologist Program, Thunder Bay North and Sioux Lookout Districts	Mason, J.K., Farrow, D., Seim, G., White, G.D., O'Brien, M.S., Walden, A., and Komar, C.	OFR 6004, 62p., 2000
Regional Geology of the Sioux Lookout Orogenic Belt, Western Wabigoon Subprovince.	Devaney, J.R.	OFR 6017, 158p, 2000 with P. Map 3342
Geology, Mineral Chemistry and Thermobarometry of the Entwine Stock, Northwestern Ontario.	Stone, D.	OFR 6021, 37p., 2000

Title	Author	Type and Year of Publication
Tantalum Mineralogy of Rare-Element Granitic Pegmatites from the Separation Lake Area, Northwestern Ontario	Tindle, A.G., and Breaks, F.W.	OFR 6022, 378p., 2000
Summary of Field Work and Other Activities 2000	Ayer, J.A. et al.	OFR 6032, p.3.1 to 3.4, 2000
Atikokan Area Lake Sediment Survey: Au and PGEs – Operation Treasure Hunt	Ontario Geological Survey	OFR 6034, 62p., 2000
Archean Metallogeny of the Mine Centre – Fort Frances area	Poulsen, K.H.	Geological Report 266, 121p., 2000 with map 2525
Geological setting of mineralization in the Mine Centre – Fort Frances area	Poulsen, K.H.	Mineral Deposit Circular 29, 121p., 2000 with map 2525
Precambrian Geology and Mineral Occurrences, Mine Centre – Fort Frances area	Poulsen, K.H.	OGS Map 2525, scale 1:50 000, 2000
Precambrian Geology, Sioux Lookout area	Devaney, J.R.	OGS Map P. 3342, scale 1:50000, 2000
Precambrian Geology, Bouheur area	Stone, D.	OGS Map P. 3401, scale 1:50 000, 2000
Precambrian Geology, Petry River area	Stone, D., Halle, J.	OGS Map P. 3426, scale 1:50 000, 2000
Precambrian Geology, Separation Lake Greenstone Belt, West Part	Blackburn, C.E., and Young, J.B.	OGS Open File Map 241, scale 1:20 000, 1994
Precambrian Geology, Separation Lake Greenstone Belt, East Part	Blackburn, C.E., and Young, J.B.	OGS Open File Map 242, scale 1:20 000, 1994
Sydney Lake Gneiss and Sulphide Deposit – Northwestern Ontario	Blewett, K.W.	MSc. Thesis, University of Manitoba, Winnipeg, Manitoba, 1976
Structural analysis in the Footwall of the Uchi-English River Subprovince Boundary, Northwestern, Ontario	Borowik, A.	MSc. Thesis, University of Toronto, Toronto, Ontario, 1998
Structural Mapping of Two Pegamitic Granites in the Separation Lake Greenstone Belt	Wiebe, N.	Undergraduate Thesis, University of Saskatchewan, Saskatoon, Saskatchewan, 1999
Mineralization and Shear Zones	Bursnall, J.T.	Geological Association of Canada, 1989
Mid-Continent Diamonds	Dunne, P.E. and Grant, B.	Geological Association of Canada, 1993
Geology of Canadian Mineral Deposits Types	Eckstrand, O.R., Sinclair, W.D., and Thorpe, R.I.	Geological Association of Canada, 1995
Geophysics in Mineral Exploration: Fundamentals and Case Histories	Lowe, C., Thomas, M.D., and Morris, W.A.	Geological Association of Canada, 1999

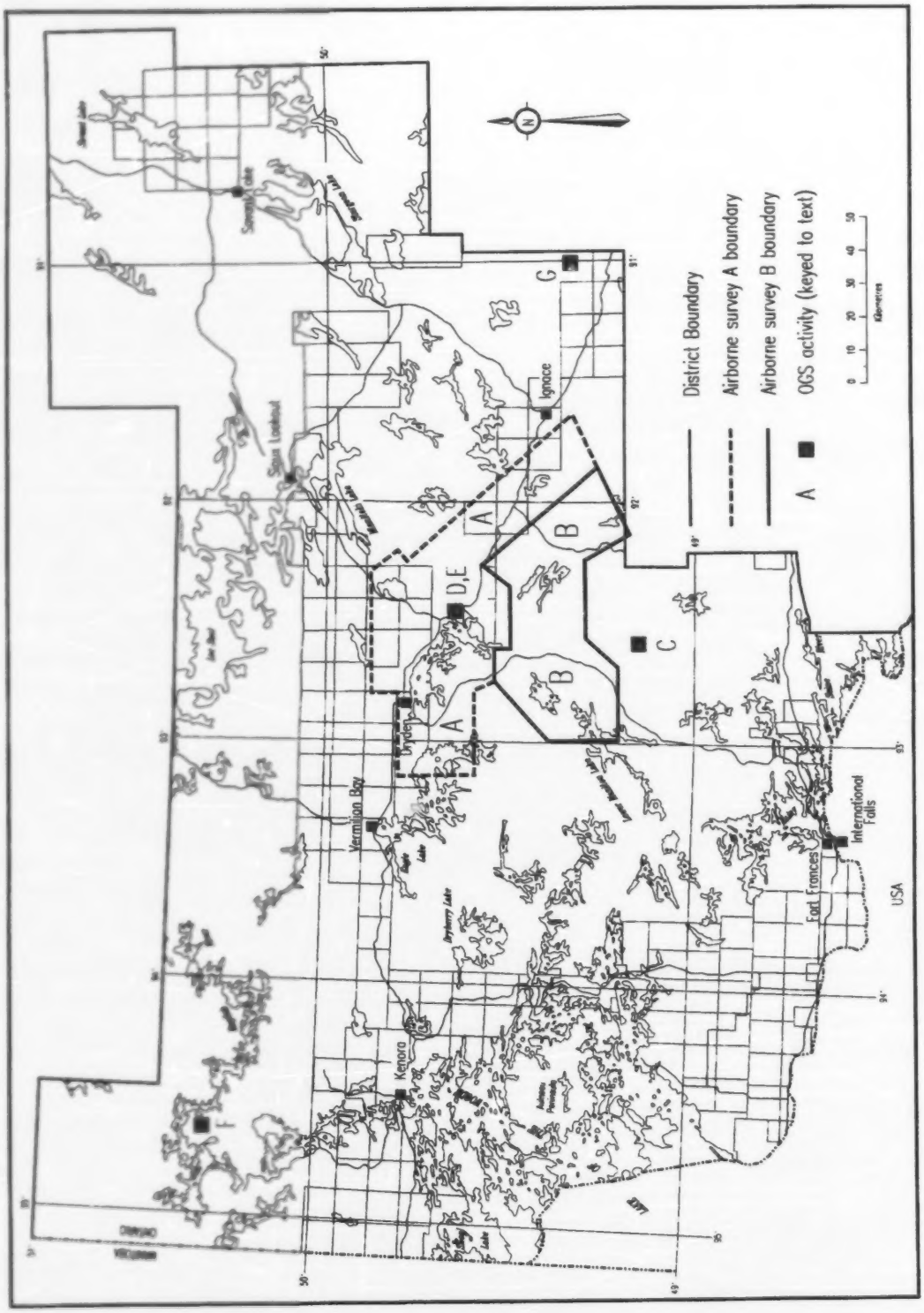

Figure 10. Kenora District OGS field activities, OTH surveys and research by others in 2000.

ACKNOWLEDGEMENTS

The District Geologists would like to acknowledge the efforts of C.C. Blackburn (Acting District Support Geologist), M. MacGregor (Clerical Support) and P. Hinz (Acting Mineral Development Co-ordinator) for their efforts throughout the year in supporting the operations of the Kenora District office. Thanks to P. Hinz and A. Lichtblau for editing the report. Thanks to the Northern Development Advisors in Fort Frances, Ignace and especially Sioux Lookout for their support.

Table 22. Mineral deposits not being mined in the Kenora District in 2000.

Abbreviations

AF.....Assessment Files
CMH.....Canadian Mines Handbook
GR.....Geological Report
MDC.....Mineral Deposit Circular
MDIR.....Mineral Deposit Inventory record
MLS.....Mining Lands, Sudbury
MR.....Mining Recorder
NM.....The Northern Miner
OFR.....Open File Report
PC.....Personal Communication

Deposit Name/ NTS	Commodity	Tonnage-Grade Estimates and/or Dimensions	Ownership References	Reserve References	Status
Bad Vermilion Lake-Seine Bay Prospect (52C/10NE)	Fe, Ti, V	1 270 000 tons of 15% TiO_2 and 45% Fe; there is potential for 177 800 tons of titanium sponge.	CMH, 1995-96, Stephanna Resources	NM 08/15/85, p.3 (Beaver Energy Resources)	Inactive, 17 claims
Bending Lake Prospect (52F/8SE)	Fe	Open pit reserves sufficient to maintain plant output of 2 million tons for 20 years. Main zone is 1500 m long by 300 m wide (grade of iron is unstated)	LTV Steel, AF	MDIR AF	Inactive, patented claims MDIR file - K0133
Big Master (Kenwest Mine) (52F/7NE)	Au	Proven and Probable: 123 000 tons of 0.30 ounce Au per ton; Indicated: 600 000 tons of 0.22 ounce gold per ton. Probable:25 000 tons@ 0.48 opt 4 500 tons@ 0.58 opt 8 500 tons@ 0.21opt Dump: 1 000 tons@ 0.25 opt	Goldcorp. Inc., Toronto; c/o David Sannes PCKRG	CMH, 1988-89, p.92 (Canamerica Precious Metals Inc.) OFR 5332, vol. 1, Table 6.8	Inactive, patented claims HP366, HP373, HP301
Big Whopper Pegmatite (52 L/07SE)	Li, Cs, Rb	Preliminary resource estimated at 7,081,700 tonnes averaging 1.285% Li_2O and 0.346% Rb_2O over strike length of 600m to a maximum depth of 250 m.	CMH, 1999-00, p.52 (Avalon Ventures Ltd.)	CMH, 1999-00, p.52 (Avalon Ventures Ltd.)	Active, staked claims.
Bonanza Mine (52F/10NW)	Au	5 000 tons of 0.25 ounce Au per ton across an average width of 1-foot.	CMH, 1994-95, p.386 (Wiscan Resources Inc.)	Van Horne Gold Expl. Inc. AF	Inactive 59 claims K53304 (site)
Canadian Arrow (Dogpaw Lake) Prospect (52F/5SW)	Au	Indicated: 96 650 tons of 0.43 ounce Au per ton in 3 veins. Probable 30 000 tons@ 0.30 opt Possible 70 000 tons@ 0.30 opt Spec. 80 000 tons@ 0.30 opt	CMH, 1999-00, p.94 (Canadian Arrow Mines Ltd.)	Canadian Arrow Mines Ltd., AF OFR 5332, vol.1, Table 4	Inactive 17 claims

Deposit Name/ NTS	Commodity	Tonnage-Grade Estimates and/or Dimensions	Ownership References	Reserve References	Status
Canamerica E Zone (52F/7NE)	Au	455 000 tonnes of 0.117 ounce Au per tonne indicated and inferred. 529 650 tonnes of 0.103 ounce Au per tonne indicated and inferred.	CMH, 1999-00, p.316 (Co-Maxx Energy Group Inc.)	NM 07/13/87, p.17(Canamerica Precious Metals Inc.) Cochrane Oil & Gas Ltd., AF	Inactive 45 claims
Cameron Lake Deposit (52F/5SE)	Au	Proven, possible, probable: 3 160 148 tons of 0.168 ounce Au per ton	CMH, 1995-96, p.275 (Nuinsco Resources Ltd.)	Nuinsco Resources Ltd.	Care and maintenance, 61 leased claims
Cedar Island Deposit-Cornucopia Mikado Mines (52E/10SW)	Au	Preliminary reserves: 1 234 069 tonnes of 9.62 g/t Au	CMH, 1995-96, p.220 (Kenora Prospectors and Miners Ltd.)	CMH, 1995-96 p.220	Inactive, patented claims D212, D265
Darkwater Mine (52G/14SE)	Au	24 000 tons with 7 150 oz Au above 250' level	Inmet Mining Corp. Ltd. (Metall Mining Corp.) CMH, 1938 p.76.	CMH, 1938 p.76. GR 221 p.4	Inactive leased claim PA 22702
Dubenski Gold Prospect (52F/05SW)	Au	Drill-indicated resource of 355 286 tonnes grading 6.32 g/t calculated to a depth of 150 m.	P. Dubenski, Kenora PC	CMH, 1999-00 p.52	Inactive, 22 leased claims.
Duport Mine (52E/11SE)	Au	Total geological reserves: 2 000 000 tons of 0.35 ounce Au per ton; Proven and Probable: 944 000 tons of 0.39 ounce Au per 450 tpd. Est pre-production cost $52.8 million	Unavailable	CMH, 1995-96 p.111	Active, patented claims S.170, K1332, K1333, K2374
Earngey-Linburg Occurrence (52E/9NW)	Au	50 m long by 5 m wide quartz vein assaying 1.42 ounce Au per ton across 7.5 feet and 0.37 ounce Au per ton across 9.7 feet.	Dean Pickell, Winnipeg , PC	OFR 5695, p.86	Inactive, patented claim K9333
Electrum Lake Occurrence Arsenic Zone (52E/11NE)	Au	97.5 m long by 1.76 m wide by 39.6 m deep (minimum) zone averaging 0.36 ounce Au per ton.	G. Pogson, Thunder Bay	OFR 5695, p.98	Inactive, staked claim 1220585
Electrum Prospect A-C Zones (Contact Zone) (52E/11NE)	Au, Cu	A zone-30 m long by 1.5 m wide by 45 m deep averaging 0.34 ounce Au per ton and 0.14% Cu B Zone-45 m long by 0.9 m wide by 61 m deep averaging 0.27 ounce Au per ton and 1% Cu C Zone-45 m long by 1.5 m wide by 30 m deep averaging 0.32 ounce Au per ton and 0.94% Cu 15 000 tons of 0.24 ounce Au per ton estimated in the C Zone.	Celyn Alcock, Kenora, Ontario	OFR 5695,p.101 Sherritt Gordon Mines Ltd., Kenora AF	Inactive, leased claims K23942, K23943
Electrum Prospect--P Zone (Electrum Fault Zone or Porphyry Zone (52E/11NE)	Au	30.5 m long by 30.5 m wide by 3.4 m deep averaging 0.40 ounce Au per ton.	Celyn Alcock, Kenora, Ontario	OFR 5695, p.106	Inactive, leased claim K20695

Deposit Name/ NTS	Commodity	Tonnage-Grade Estimates and/or Dimensions	Ownership References	Reserve References	Status
Electrum Prospect-W Zone (Fault zone or West Zone) (52E/11 NE)	Au	61 m long by 2.1 m wide by 19.8 m deep averaging 0.23 ounce Au per ton. 100 000 tons of 0.33 ounce Au per ton in the P & W zones combined.	Celyn Alcock, Kenora, Ontario	OFR 5695,p.108 Laramide Resources Inc. Annual Report, 1987	Inactive, patented and leased claims K20696-K28663
Errington Prospect (52F/6SW)	Au	24 000 tons of 0.73 ounce Au per ton in a zone 450 feet long by 32 inches wide by 240 feet deep.	Lawrence Mattson Linnstrom, Minn. U.S.A., MLS	MDC 16, p.16	Inactive, patented claims K7181, 7183, 7184, 7186
Evenlode Prospect (Eco Occurrence) (52E/11NE)	Mo, Au	126 000 tons of 0.68% MoS_2 and 0.015 ounce Au per ton. Indicated: 200 000 tons of 0.63% MoS_2; Inferred: 550 000 tons estimated to a depth of 800 feet.	Patented claims – D. Smerchanski. Staked claims – D. Meek	OFR 5695,p.114	Inactive, patented claims K8705, K8707, staked claims 1229467, 1229468
Flambeau Lake Prospect (52F/10NW)	Au	Diamond drilling partially outlines a zone with potential for 572 000 tonnes (gold grade unstated).	Alex Kozowy, Dryden, PC	AF	Inactive, patented claim AL88
Foley Mine (52C/10NE)	Au	40 000 tons @ 0.5 opt proven/probable; 400 000 tons @ 0.5 opt speculative.	R. Cone, Fort Frances	NM 09/25/80 (Seaforth Mines Ltd.) OFR 5539, p.194	Inactive, patented claims K475101, K475102, K475103
Gaffney Prospect (52F/7SW)	Au	300 000 tons of 0.15 ounce Au per ton .	San Paulo Expl. Inc. (CMH, 1990-91, p.393)	CMH, 1990-91, p.393	Inactive, patented K3594, 3595
Golden Star Mine (52C/10NE)	Au	10 000 tons of 0.45 ounce Au per ton 20 000 tons of 0.42 ounce Au per ton and 35 000 tons of 0.15 ounce Au per ton in tailings dump.	PIRP Holdings Inc., AF	OFR 5512, p.44 MDC 16, p.20	Inactive, patented claim AL116, leased claim K44632
Goldlund Mine 52F/16NW	Au	781 000 tons of 0.14 ounce Au per ton	Goldlund Mines Ltd. OFR 5518	OFR 5518 p. 89	Inactive. Patented claim KRL 18802
High Lake Prospect (52E/11NE)	Cu, Mo, Au	2000-foot long by 250-wide zone containing assay values of 0.10% to 1.35% Cu and 0.01 to 0.05 ounce Au per ton .	Celyn Alcock, Kenora, Ontario	GR 41, p.46	Inactive, leased claim K32307
Kenbridge Prospect (52F/5NE)	Ni, Cu	3 271 390 tons of 1.06% Ni and 0.54% Cu.	CMH, 1986-87, p.209, (Falconbridge Limited)	GR 111, p.44	Inactive, patented claims K6672, K6634, K6635
Lyon Lake Zone (52G/15NW)	Cu, Zn, Pb, Ag	574 000 tons of 0.63% Cu, 9.68% Zn, 1.81% Pb and 6.70 oz per ton Ag	Noranda Inc. CMH 1992-93 P.256	GR 221 p. 4 CMH 1993-93 P.356	Inactive, patented claims CLM 185
Marchington Road Deposit (52J07SE)	Cu, Zn, Pb, Ag	150 000 tons @ 0.98% Cu, 3.11% Zn, 1.16% Pb, 1.97% Ag	Umex Inc. AF.	Umex Inc. AF.	Inactive, patented claim CLM 337

Deposit Name/ NTS	Commodity	Tonnage-Grade Estimates and/or Dimensions	Ownership References	Reserve References	Status
Mavis Lake Prospect (52F/15SE)	Li, Ta	500 000 tons of 1% Li_2.	CMH, 1999-00, p.293, (New Claymore Resources Ltd.).	OFR 5718, p.151	Inactive, leased claims K498288, K498289, K498290, K498292, K498308, K498140
Mattabi Mine (52G/15SW)	Cu, Zn, Pb, Ag	387 000 tons of 0.13% Cu, 9.28% Zn, 0.58% Pb and 1.77 oz per ton Ag	Noranda Inc. CMH 1998-89 P.338	GR 221 p. 4 CMH 1998-89 P.338	Inactive, patented claims GTP Block 7
Maybrun Mine (52F/5NE)	Cu, Au	2 824 825 tons of 1.18% Cu and 0.08 ounce Au per ton including 1 508 454 tons of 1.48% Cu and 0.11 ounce Au per ton.	CMH, 1995-96, p.108 (Consolidated Maybrun Mines Limited)	GR 111, p.36	Inactive, property on care and maintenance, patented claims K15364-K15381, K15524- K15527
McEdwards Lake (52J02SE)	Au	Au in porphyry dikes with strike length 200' with assays up to 15 ounce per ton Au over 3 ft.	Unknown	Thunder Bay News Chronicles, 1937.	Inactive, patented claim TB 10629
Mironsky Prospect (52C/11NE)	Cu	400 feet long by 35 feet wide zone to a minimum depth of 300 feet averaging 0.53 to 1.01% Cu. 300 000 tons of 0.8% Cu (estimated).	Bond and Clark & Eveligh	GR 115, p.58	Inactive, staked claim
New Campbell Island Mines (Richard Lake) Prospect (52F/13SW)	U	650 000 tons of 0.10% U_3O_8 in a zone 700 feet long by 10 feet wide and 1000 feet deep.	Unknown	GR 130, p.46	Inactive, patented claim K18761
Norpax (Reynar Lake) Prospect (52L/6NE)	Ni, Cu	1 010 000 tons of 1.2% Ni and 0.5% Cu.	CMH, 1995-96, p.149 (Falcon Point Resources Ltd.)	Norpax Nickel Mines Ltd., AF	Inactive, patented claims KRL350101, KRL34767
North Kaskaweogama Prospect (52J/07NW)	Fe	405 000 tons in 4 zones @ 28% Fe.	Open for staking	MDC 11, p 443-444	Open for staking
Northrock (South Grassy) Prospect – Beaver Pond Zone (52C/11NE)	Cu	1 020 458 tons of 1.17% Cu over a strike length of 400 m including 265 230 tons of 2.08% Cu over a length of 300 m (all estimates valid to a vertical depth of 91m).	Bond and Clark & Eveligh	OFR 5512, p.50	Inactive staked claims
Olive (Preston) Mine (52C/15SE)	Au	12 5000 tons of 0.34 ounce Au per ton in 2 mineralized shoots and 1100 tons of broken ore averaging 0.31 ounce Au per ton in the second level stope.	CMH, 1995-96, p.269, (Noront Resources Inc.)	NM 05/18/87, p.6, NM 06/29/ 87, p.21 (HSK Minerals Ltd.), AF	Inactive, leased claims K475146, K475190-193, K475269
Pidgeon Molybdenum Mine (52F/16NW)	Mo	275 000 tons at 0.6 % Mo	Unavalable	OFR 5519, p.113 MRC 7, p.38	Inactive, patented claims Pa 14051
Purdex Prospect (A-D Zones) (52E/11NE)	Au	76 500 tons of 0.308 ounce Au per ton (combined indicated tonnage in 4 zones). 241 000 tons at 0.226 ounce Au per ton in the P,A,B and C zones.	CMH,1995-96, p.233 Unknown	OFR 5695, p.273 CMH, 1995-96 p.233	Inactive, patented claims K25130-131

Deposit Name/ NTS	Commodity	Tonnage-Grade Estimates and/or Dimensions	Ownership References	Reserve References	Status
Regina Mine (52E/8NE)	Au	Speculative 19 650 tons of 0.44 opt. 30 000 tons at 0.106 ounce Au per tons in tailings.	Unknown	Lodi Metals Inc. AF; NM 07/25/88, p.7 (Sweaney Gold Corp.)	Inactive, patented claims P566-67
Richelieu Mine (52J02NE)	au	A bulk sample from 2.8 ft quartz vein taken at 125 ft level averaged 0.5 ouncesAu per ton.	Unknown	MDC 13 p. 294	Inactive, Patent claim Pa 19051, Pa 19052
Scramble (Homestake) Mine (52E/16SW)	Au	1200- to 1500-foot long by 12 foot wide zone averaging 0.15 ounce Au per ton. 150 000 tons at 0.24 opt and 1500 at 0.24 opt and 70 000 ounces (using cut-of f @ 0.05 opt.) drill indicated.	Boise Cascade Corporation, PC	NM 07/25/88 (Madeline Mines Ltd.) CIMM, Dist.4 Field Trip Guidebook, p.44	Inactive, Jaffray Twp., Con.6, Lot 13 and 14
St Anthony Mine (52J/02SE)	Au	37 800 T @ 0.18 oz Au per ton	Unknown	MDC 13 p. 295-295	Inactive, patented calim BG 154
Tabor Lake Mine (52F/9SW)	Au	Possible 14 000 @ 0.41 opt; Speculative 3000 @ 0.41 opt.	Sulpetro Minerals Ltd., AF	OFR 5332, vol.1, Table 12	Inactive, 37 patented claims, mine site on K502044
Thunder Lake Deposit (52 F/15SE)	Au	Drill-indicated resource of 3.78 million tonnes averaging 7.02 grams per tonne Au (equivalent to 853,000 ounces Au)	CMH, 1999-00, p.125 (Corona Gold Corp.)	CMH, 1999-00, p.125 (Corona Gold Corp.)	Inactive, patented and staked claims.
Vanlas Prospect (Kidd Zone) (52F/10NW)	Au	100 000 tons of 0.20 ounce Au per ton	Power Expl. Inc. Annual Report, 1988	Power Expl. Inc. AF	Inactive, patented claim K70627
Victor Island Prospect (52F/5SE)	Au	Drill indicated reserves: 300 000 tons at 0.12 ounce Au per ton to a depth of 700 feet.	CMH, 1997-98 p.346 (Nuinsco Resources Ltd.)	MP 128, p.16	Inactive, patented claim K4712 Claims 690655, 718785
Virginia Prospect (52F/5NE)	Au	100-foot wide zone averaging 0.10 ounce Au per ton.	C.C. Hart, Villanova, Penn., U.S.A.	G111, p.40	Inactive, patented claim F.M.73A
Wind Bay Prospect (52C/10 NW)	Zn, Cu	1300 m long by 50 m wide zone hosts several 10 m wide mineralized lenses. Typical diamond drill hold intersections assayed 1.5% Zn, 0.2% Cu and 1.1% Zn, 0.09% Cu across 7 m and 8.6 m, respectively.	Open for staking	OFR 5512, p.89	Inactive
Witch Bay Occurrence (52E/9SE)	Au	8.2 g/t Au to 29.5 g/t Au across 30 to 36 cm for a length of 240 m.	G. Pogson, Thunder Bay	OFR 5695, p.370	Claim 1220532

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Ontario

Ontario Geological Survey
Regional Resident Geologist Program

Northwest Regional Land Use Geologist District – 2000

by

R. Debicki and A. Drost

2001

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REGIONAL LAND USE GEOLOGIST – NORTHWEST

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Introduction

Over the past several years, the Government of Ontario has re-engineered the way it delivers services to the people of Ontario. The changes that may be most familiar to the exploration community are the centralization of the Mining Recorders in the province and the posting of claim maps and claims information on the Ministry's website. At the same time, other changes have happened in other ministries throughout government. Some of them have had implications for the Resident Geologist Program.

As a result of these modifications, staff of the Resident Geologist Program have found themselves dealing with new clients in government, agencies, and non-governmental organizations, and delivering services that they had not delivered in past. These new services are important. Many of them relate to land use planning matters that are of interest to, or may directly affect, prospectors and developers. Many of them require knowledge and expertise that are outside the traditional knowledge and experience of professional geoscientists.

Some of these services relate to managing Crown land. They include working with the Ministry of Natural Resources to implement *Ontario's Living Legacy* which involves the establishment of 378 new parks or park expansions and conservation reserves across Ontario, and defining areas of "provincially significant mineral potential" within these new protected areas where mineral exploration will be allowed to proceed. They include administering work permits required for exploration activity in defined environmentally sensitive areas where natural heritage values need special protection, and ensuring that the mineral sector's interests are considered and accommodated in other land use planning initiatives such as forest management plans and the sale and transfer of Crown land.

Other services relate to municipal planning. They include working with Ministry of Municipal Affairs and Housing to review new municipal Official Plans, Official Plan Amendments, and consents (lot severances). Changes made to the *Planning Act* in 1996 recognize the interests of the mineral sector and the importance of protecting areas of high mineral potential from incompatible uses, and require that these considerations be factored into the municipal planning process. These considerations are important in the north where municipalities encompass huge tracts of land, including large areas of base and precious metals potential. They are also important in the south where industrial minerals are essential to the current, rapid expansion of existing communities and to the development of new ones.

In addition, there are emerging requirements for staff of the Resident Geologist Program to help ensure that access to the land base remains open to the exploration community, and to work with First Nations and the mineral sector to develop shared understanding of the other's rights, obligations, and interests in mineral exploration and development on Crown land.

These new and emerging needs were resulting in Resident Geologist Program staff having to divert their energies away from the traditional client services provided to the exploration and development community to attend to land use planning matters. On average, about 20 per cent of staff time was being

directed toward such work – although in Southern Ontario, land use planning consumed as much as 75 per cent of staff time. The end result was less time being available for delivering the level of traditional program services to which mineral industry clients had become accustomed.

To address these converging concerns, three new positions were created and the new "Regional Land Use Geologists" were hired in the autumn of 2000 to alleviate some of the pressures that impacted on the program. These new positions combine geoscience and mineral sector expertise with an understanding of land use legislation, regulations and issues.

Regional Land Use Geologists

Abraham Drost, the Regional Land Use Geologist based in Thunder Bay, is responsible for matters related to land use in the Red Lake, Kenora, Thunder Bay North and Thunder Bay South Resident Geologist districts. He has an M.Sc. degree in geology and a Certificate in Environmental Assessment, and has studied real estate law. Abraham has 16 years' experience in mineral exploration and development and was involved in the discovery of the past-producing Golden Patricia gold mine in northwestern Ontario. He has served on the executive of prospectors' organizations in Thunder Bay and Timmins.

Gord Yule, the Regional Land Use Geologist based in Timmins, is responsible for matters related to land use in the Timmins, Kirkland Lake, and Sault Ste. Marie Resident Geologist districts, plus those portions of the Sudbury Resident Geologist District north of the French River. He has a B.Sc. degree in geology, and 25 years' experience in mineral exploration, during which time he has been involved in the discovery of eight deposits in northeastern Ontario, including five past and present producers.

Dave Rowell, the Regional Land Use Geologist based in Sudbury, is responsible for those portions of the Sudbury Resident Geologist District south of the French River, including Manitoulin Island, plus the Southwestern Ontario and Southeastern Ontario Districts. Dave has an M.Sc. degree in Physical Geography, and 18 years' experience in mapping surficial geology and defining and managing aggregate and industrial mineral resources in the private sector and with the Government of Ontario.

The boundaries of the Regional Land Use Geologist Districts are shown on the map included in the preface to this report.

The result of these appointments, which mark the first significant increase in Resident Geologist Program staff in many years, will be twofold. There will be a reduction of the workload relating to land use issues for other Resident Geologist Program staff, allowing them to concentrate more fully on "traditional" services including:

- maintaining and providing access to assessment files, the drill core library system and other geoscience databases;
- providing information and expert advise on local geology and its mineral endowment;
- conducting client property visits and geology field trips; and
- monitoring exploration activity and generating new recommendations for exploration.

The Regional Land Use Geologists will focus their attention on "emerging" services including:

- providing mineral-related information in support of Crown land planning;

- protecting mineral resources and operations from "sterilization", and people and property from mining and natural hazards during municipal planning; and
- helping explorationists and First Nations understand each other's interests, activities and obligations in mineral exploration and development.

The Resident Geologist Program has created these new staff positions to ensure that knowledgeable service is provided regarding these and other land use issues, since finding solutions to these matters is vital to the health and sustainability of the mineral sector. Liaison with and input from mineral sector representatives, including local prospectors and their associations, will form an essential contribution to the successful delivery of land use planning services that support mineral exploration and development.

REGIONAL LAND USE GEOLOGIST ACTIVITIES

Crown Land Planning

The Ministry of Natural Resources manages Crown land in Ontario through the *Public Lands Act*, the *Parks Act*, the *Aggregate Resources Act*, the *Crown Forest Sustainability Act*, the *Conservation Authorities Act*, the *Oil, Gas and Salt Resources Act*, and other acts. The Ministry of Northern Development and Mines also contributes to Crown land management in the province through the *Mining Act*.

The Regional Land Use Geologists are working closely with Ministry of Natural Resources and their partners in several key areas. They are helping implement the *Ontario's Living Legacy* land use strategy by assisting in the regulation process for the new parks and conservation reserves, and in the development and application of criteria to allow "controlled exploration" in areas within those protected sites where there is provincially significant mineral potential.

They are helping to develop guidelines for the nine "Signature Sites" identified through the *Ontario's Living Legacy* land use strategy; reviewing management plans for both existing and new protected areas; and contributing to other land use planning and policy matters such as the Niagara Escarpment Plan.

The Regional Land Use Geologists are also working to help the mineral exploration and development community understand the forest management planning process, and to know how and when prospectors and developers should participate to ensure that their interests are considered. Forest management plans set the framework for activities in forest units for twenty-year spans, and establish the schedule and locations for access routes during that time. In addition, the Regional Land Use Geologists are working with the Ministry of Natural Resources to establish strategies for allowing the mineral sector to continue to access existing forest access roads.

Development on Private Land

The Ministry of Municipal Affairs and Housing manages planning on private land in Ontario through the *Planning Act*, the *Municipal Act*, and other legislation. Through their one-window approach, the Ministry of Northern Development and Mines (MNDM) contributes to municipal planning by providing mineral-related technical information regarding private land to municipal governments,

provides advice on planning matters that may affect mineral exploration and development, and comments on areas of mineral potential or mining-related hazards.

In conjunction with other program staff, the Regional Land Use Geologists review and comment on draft municipal Official Plans and Official Plan Amendments along with other planning matters including subdivision plans and consents (lot severances) where the approval authority lies with the Province of Ontario. They also provide training sessions and reference materials to representatives the Ministry of Municipal Affairs and Housing and to municipal planners representing communities across the province. In addition, they may be called upon to serve as "expert witnesses" in cases where planning decisions are being reviewed by the Ontario Municipal Board or other tribunals.

First Nation Interests

First Nation communities across Ontario are looking for new economic opportunities. As well, they are asserting their Aboriginal rights and claiming higher levels of involvement and control concerning economic activity on Crown land within their traditional areas. As a result of a lack of clarity regarding Aboriginal rights on one hand, and some First Nations' lack of familiarity with the "mining sequence" on the other, conflicts have arisen between some explorationists and developers and certain First Nations.

The Regional Land Use Geologists are working with the mineral sector and with representatives of other government ministries and First Nation communities to establish mutual understanding of the actions, implications, and obligations of mineral exploration and development workers, and to facilitate their activities on traditional lands. This work includes sharing information concerning Aboriginal rights and the related obligations of the mineral sector, and discussing the stages of the mining sequence and resulting business opportunities with First Nation community members. The Regional Land Use Geologists are also helping resolve certain land claims in their respective areas.

REGIONAL DISTINCTIONS

It is worthwhile to note that there are significant differences between the critical land-use planning concerns in different parts of Ontario. Northwestern Ontario can be considered the province's "exploration frontier" while northeastern Ontario is an area of more mature exploration and established mining. Southern Ontario is more populated and mineral sector interests are concentrated on a growing industrial mineral and aggregate industry. Each region has its distinct assemblage of planning-related issues.

Northwestern Ontario, the province's "exploration frontier", is characterized by large tracts of open Crown land. Forest management and logging activities are regionally important and First Nation communities throughout the region are expressing their interest in Aboriginal rights. The area has limited infrastructure and access to remote areas, and is considered under-represented in terms of protected areas.

Northeastern Ontario has a high density of mining land tenure and numerous producing and past-producing mines. Forest management and logging activities are also regionally important and there are local to widespread Aboriginal issues. The area is also considered to be under-represented in terms of protected areas, but has more urbanization, infrastructure and private land holdings than northwestern Ontario, making it more difficult to identify unencumbered lands that may be set aside to protect and preserve natural heritage values.

Southern Ontario is an area with much higher population density and a relatively small amount of Crown land, and a greater focus on a growing industrial mineral and aggregate industry. There is major urbanization and well-developed infrastructure, however the high population density leads to greater opposition to many mineral-related activities and developments.

NORTHWESTERN ONTARIO ACTIVITIES

Introduction

There are at least 12 major provincial legislative acts, with accompanying regulations, guidelines and policies developed by several provincial ministries that relate to land use in Ontario. Some apply to Crown land while others apply to private land. The Regional Land Use Geologist combines geoscientific, mineral exploration and development expertise with an understanding of provincial legislation, regulations, policies and land use issues in order to optimize Ontario's land base for sustainable, safe and environmentally responsible mineral resource development.

The Northwest Regional Land Use Geologist delivers on this mandate with other provincial ministries, municipalities, land-use interest groups and First Nations within the region to address matters including implementing the *Ontario's Living Legacy* land use strategy, preparing forest management plans and monitoring development on private land.

Ontario's Living Legacy Land Use Strategy

A total of 96 *Ontario's Living Legacy* sites are identified as new protected areas in northwestern Ontario. These include 21 new provincial parks or additions to existing parks (designated P-series), and 75 new conservation reserves (designated C-series). Thirty-five of the new parks and conservation reserves in the northwest have been announced for regulation by the Ministry of Natural Resources (MNR) by early 2001. All new proposed protected areas were reviewed by the Regional Land Use Geologist in order to ensure that pre-existing mining land tenure was properly designated as Forest Reserve, i.e. areas in which mineral exploration will continue to be allowed as long as the mining land tenure remains in good standing. The Regional Land Use Geologist also participated on the Lake Nipigon Basin Signature Site planning team.

The *Ontario's Living Legacy* land use strategy allows for controlled mineral exploration in specified areas within new parks and conservation reserves identified as having "provincially significant mineral potential" (PSMP). If a mineral discovery is made in such an area and the site develops into an advanced exploration project or a new mine, the area of the discovery or proposed disturbance will be de-regulated and an appropriate, alternative area of equal size and natural heritage value will be regulated as protected area. Upon site rehabilitation at the completion of the exploration/mining activity the deregulated land will be returned to park status.

The Regional Land Use Geologists have contributed to a committee of industry and government representatives assembled to define the criteria for "provincially significant mineral potential" and a process for ranking the potential of areas of interest. At the time of writing, the process for defining PSMP is currently close to completion. It is envisioned that this mineral potential evaluation process will be incorporated into future land use planning activities and initiatives for both Crown and private lands in the province.

Forestry Management Plans

The Regional Land Use Geologist, in co-operation with the Ontario Prospectors Association (OPA), has spearheaded development of a Microsoft® Access® database of information related to Forest Management Plans in Ontario for use by clients and those involved in the forest management planning process. The database is part of a larger effort to co-ordinate MNDM and OPA planning interests in the context of forest management planning and to stimulate the proactive involvement of the prospecting and exploration community in the planning process.

Development of formal "Guidelines for Strategic Access to Mineral Values" by the Regional Land Use Geologist is a further extension of joint MNDM-OPA co-operation in planning interests. It is envisioned that these guidelines will eventually be included as a formal part of forest management planning process in Ontario. Access to known mineral values and areas of significant mineral potential would then be optimized as new forest-access roads are planned and built by the forest companies operating throughout the province.

Development on Private Land

The Northwest Regional Land Use Geologist reviewed a total of 24 applications for development on private land in the last quarter of 2000. Most files were circulated for review and comment by a partner ministry, the Ministry of Municipal Affairs and Housing (MMAH). All applications were reviewed for their impact on mineral exploration and development opportunities and activities within areas of high mineral potential, and for their proximity to mine hazards.

Further effort, including a site visit and presentation to a town council, was made in reference to a site under application by a private developer wanting to subdivide patented mining claims for cottage lot development. An increasing number of such applications are under evaluation by the Ministry. All are considered in the context of the mineral potential of the sites and the presence of mine hazards that may pose potential public safety and environmental concerns.

First Nation Interests

The Northwest Regional Land Use Geologist provided assistance to a junior exploration company with regard to their plans for conducting mineral exploration on claims within Aboriginal traditional lands. Exploration and development activities in remote parts of the northwest and other regions of the province are increasingly becoming issues for discussion between explorationists and Aboriginal communities intent on building greater autonomy and economic self-reliance. Increasingly, explorationists are entering into a Memorandum of Understanding (MOU) with individual Aboriginal communities that identify the terms and conditions for releasing information to the First Nations and for respecting the natural environment.

Metric Conversion Table

Conversion from SI to Imperial			Conversion from Imperial to SI		
SI Unit	*Multiplied by*	*Gives*	*Imperial Unit*	*Multiplied by*	*Gives*
		LENGTH			
1 mm	0.039 37	inches	1 inch	**25.4**	mm
1 cm	0.393 70	inches	1 inch	**2.54**	cm
1 m	3.280 84	feet	1 foot	**0.304 8**	m
1 m	0.049 709	chains	1 chain	20.116 8	m
1 km	0.621 371	miles (statute)	1 mile (statute)	**1.609 344**	km
		AREA			
1 cm^2	0.155 0	square inches	1 square inch	**6.451 6**	cm^2
1 m^2	10.763 9	square feet	1 square foot	**0.092 903 04**	m^2
1 km^2	0.386 10	square miles	1 square mile	2.589 988	km^2
1 ha	2.471 054	acres	1 acre	0.404 685 6	ha
		VOLUME			
1 cm^3	0.061 023	cubic inches	1 cubic inch	**16.387 064**	cm^3
1 m^3	35.314 7	cubic feet	1 cubic foot	0.028 316 85	m^3
1 m^3	1.307 951	cubic yards	1 cubic yard	0.764 554 86	m^3
		CAPACITY			
1 L	1.759 755	pints	1 pint	0.568 261	L
1 L	0.879 877	quarts	1 quart	1.136 522	L
1 L	0.219 969	gallons	1 gallon	**4.546 090**	L
		MASS			
1 g	0.035 273 962	ounces (avdp)	1 ounce (avdp)	28.349 523	g
1 g	0.032 150 747	ounces (troy)	1 ounce (troy)	**31.103 476 8**	g
1 kg	2.204 622 6	pounds (avdp)	1 pound (avdp)	**0.453 592 37**	kg
1 kg	0.001 102 3	tons (short)	1 ton (short)	**907.184 74**	kg
1 t	1.102 311 3	tons (short)	1 ton (short)	**0.907 184 74**	t
1 kg	0.000 984 21	tons (long)	1 ton (long)	**1016.046 908 8**	kg
1 t	0.984 206 5	tons (long)	1 ton (long)	**1.016 046 90**	t
		CONCENTRATION			
1 g/t	0.029 166 6	ounce (troy)/ ton (short)	1 ounce (troy)/ ton (short)	34.285 714 2	g/t
1 g/t	0.583 333 33	pennyweights/ ton (short)	1 pennyweight/ ton (short)	1.714 285 7	g/t

OTHER USEFUL CONVERSION FACTORS

	Multiplied by	
1 ounce (troy) per ton (short)	31.103 477	grams per ton (short)
1 gram per ton (short)	0.032 151	ounces (troy) per ton (short)
1 ounce (troy) per ton (short)	20.0	pennyweights per ton (short)
1 pennyweight per ton (short)	0.05	ounces (troy) per ton (short)

Note: Conversion factors which are in bold type are exact. The conversion factors have been taken from or have been derived from factors given in the Metric Practice Guide for the Canadian Mining and Metallurgical Industries, published by the Mining Association of Canada in co-operation with the Coal Association of Canada.